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BRITISH BIRDS

WITH WHICH WAS INCORPORATED IN JANUARY, 1917, "THE ZOOLOGIST."

AN ILLUSTRATED MAGAZINE DEVOTED
CHIEFLY TO THE BIRDS ON THE BRITISH LIST

EDITED BY

H. F. WITHERBY, M.B.E., F.Z.S., M.B.O.U., H.F.A.O.U.

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SOME OBSERVATIONS ON THE MARSH-HARRIER

BY

ERIC J. HOSKING, M.B.O.U., F.R.P.S.

(Plates 1-4.)

THE status of the Marsh-Harrier (*Circus a. aeruginosus*) as a breeding bird in Great Britain has for many years been very precarious. For at least 45 years prior to 1915 there are no records of successful breeding though three attempts were made at intervals in Norfolk. In 1915 a pair bred at Hickling, but neither they nor their offspring returned to nest. According to Rivière's *History of the Birds of Norfolk* (1930) two birds were present in 1919, but did not breed, and it was not until 1921 that a pair again bred successfully. After this there followed a lapse of six years before a very small number of pairs—between one and four—settled down in 1927. Since then they have bred regularly, although not more than three pairs have been recorded as actually rearing young in any one season. Norfolk is the only British county in which they are known to breed, with the possible exception of Suffolk, where instances may have occurred in recent years. It is not difficult to suggest reasons for their rarity, and inability to increase. They are not good parents and will desert either eggs or young at the least disturbance, and there are not many parts of the Broads which are not disturbed in normal times. They have frequently been known to lay full clutches of infertile eggs. They feed very largely upon small birds and the young of game birds, which makes them unwelcome guests in many localities. And, of course, their very rarity attracts undesirable attention.

Last spring (1942) Mr. Jim Vincent and I were able to keep a fairly close watch on the Norfolk Marsh-Harriers and the following observations may be of some interest. One of the first items of note was that three hens appeared, but only one cock was seen throughout the whole breeding season. One of the hens built a nest and laid six eggs, but these were all infertile and were eventually given to the Castle Museum, Norwich, by Major Anthony Buxton. This bird is believed to be an old hen which returns regularly to this locality, although for the last few years at any rate she has not succeeded in rearing young. My notes, therefore, will be confined to the activities of the other three birds.

On April 19th, Jim Vincent found the first nest when only the preliminary pieces of sedge had been placed into position. It was in a very thick, rank sedge marsh, standing in some inches of water, and was built on the sedge 24 inches above the level of the ground. On May 6th I was able to accompany Jim Vincent to the site, when we found that the nest was completed and ready for eggs. There were three eggs in the nest on the 13th, and at our next visit on the 20th the full clutch of five had been laid. Throughout the period of incubation material was being constantly added to the nest, which eventually measured 18 inches in diameter.

The first egg hatched on June 7th, the second on the 9th, the third on the 12th, the fourth on the 14th, and the fifth on the 17th.

Mr. Ian M. Thomson and I decided to make an attempt at photographing this pair, and we erected a hide, well camouflaged, some considerable distance from the nest, which we were able to do without disturbing the hen. On subsequent days this photographic hide was moved nearer and nearer to the nest still without causing any suspicion although the cock usually circled overhead, calling. It was only when we finally erected the hide 12 feet from the nest that the hen left, and on that occasion we watched her return from a dyke-wall some distance away. On being disturbed she flew from sight, but within half-an-hour she was coming towards the nest, and we could clearly see that she had food in her talons. As she neared the breeding marsh we observed the cock flying towards her, also with food in his talons, and it appeared that he was trying to pass this food to her, but that she was unable to take it as her talons were already fully engaged. Both Marsh-Harriers circled round and round, then the cock dropped down to the nest and was followed immediately by the hen. For some seconds they were both at the nest together, then the cock flew up and left the vicinity.

Shortly after this Jim Vincent and I were watching over this area when we made an interesting discovery. We saw the cock fly in, circle over the nest, and a moment afterwards the hen flew up to receive food from her mate which she immediately took back to the nest. The cock continued hunting, and we watched him quartering the ground in the manner characteristic of this Harrier. He dropped down to the ground to rise a minute or so later with food dangling from his talons. With this he flew to a spot on another marsh about 300 yards from the nest under observation, and after circling he was met by a second hen which received the food from him. For some time we had suspected that the two hens were both mated to this cock, but this was the first definite proof we had, and the incident provided what is, I believe, the first known case of a polygamous cock Marsh-Harrier. In my opinion this was a case of enforced polygamy as, had there been two cocks, it is probable that each would have taken a single hen. The following day Jim Vincent located the second nest.

While on the subject of polygamy amongst the Harriers, it may not be out of place to say that we had evidence of the same trait in the Montagu's Harrier (*Circus pygargus*). For the first time since the floods of 1938 Montagu's Harriers nested in this area of the Broads, and in this case two hens and one cock arrived very late in the season—they had probably been disturbed from another breeding ground. The cock mated with both hens, who each built a nest not more than 300 yards apart, and both reared young. The cock fed these hens more or less alternately. Polygamy in Montagu's Harrier has been recorded on several occasions.

We were gratified at our success in building our hiding-place without disturbing the Harriers, and were looking forward to

spending many hours watching these birds from close quarters. We were to be disappointed however, for, without warning, there occurred a disastrous incident, which provided evidence of the Marsh-Harrier's proclivity to desert. Sunday, June 21st, was a delightfully hot day, the first in the district for some time, and it tempted many of the local children to swim, fish, and play games near the broad dyke which flowed along within a few yards of the nests, both near to the water, although some distance apart. The children were thus the innocent means of bringing catastrophe to both families. The second nest we had found was deserted altogether, and the three small chicks perished. The nest at which we were attempting photography was not entirely abandoned, but from that day onwards neither parent fed or brooded the young. They refused to take any more active part in rearing them than was necessary to drop food in the nest, after which they left immediately. As the young were far too small and feeble to pull the food to pieces and feed themselves, they would undoubtedly have died as well but for our fortunate advent. When my wife and I arrived at the nest that evening, we found the five young cold and hungry, and we decided to attempt to feed them. I pulled to pieces a young plesasant (*Phasianus colchicus*) which had been brought in some time previously, and the young took morsels of this from me without hesitation. I fed them until they would take no more.

Early next morning we paid another visit, to find that the smallest chick was dead—we had hardly expected it to live—and that the others were stiff with cold. Whilst my wife warmed them I prepared three newly fledged Meadow-Pipits (*Anthus pratensis*), which the adults had dropped since the previous evening. As the young were warmed and fed life seemed to surge into them, and they became very active. We left after the meal was completed.

During this visit no sign was seen of the hen but the cock had circled over our heads calling continuously. We now realised that if these young were to be reared at all we should have to take on the rôle of foster-parents, and, accordingly, it became our duty to visit the nest regularly each day. Unfortunately food alone was insufficient to preserve the spark of life, and the cold of the nights out on the marshes proved fatal to two more of our charges, which died from exposure in spite of our care. Yet another of the young disappeared from the nest in some unaccountable way, so that eventually only one remained.

On June 23rd, as we were approaching the marsh we saw the cock fly towards the hen, who was perched on a dead tree-stump, and there mate with her. During copulation the hen crouched very low, almost in a horizontal position, and the cock slowly flapped his wings. On two further occasions mating was seen, and in each case the hen was perched on this same tree-stump, although in the normal way it was by no means one of her favourite perching-places. This almost suggests that the particular stump had a special significance for them, but, taking into account the lateness of the



MARSH-HARRIER

Male flying to the nest with a day-old Partridge in his bill. Hickling, Norfolk, 1942.

(Photographed by Eric J. Hosking.)



MARSH-HARRIER

Male alighting at the nest with food in his bill. Hickling, Norfolk, 1942.

(Photographed by Eric J. Hosking.)



MARSH-HARRIER

Male hovering over the nest with food in his talon. Hickling, Norfolk, 1942.

(*Photographed by Eric J. Hosking.*)



MARSH-HARRIER

Male dropping down to the nest with food in his talon. Hickling,
Norfolk, 1942.

(Photographed by Eric J. Hosking.)

date and the fact that these birds are single-brooded, it would be natural to suppose that the gonads had regressed and all sexual desire would have ceased.

As the photographic hide was in position we saw no reason why we should not attempt to obtain some records of the parents bringing in the food, and, accordingly, many days were spent in concealment with this object. The first of these was June 24th. On our arrival at 9 a.m. we found the surviving chick stiff with cold—the previous night had been a bitter one—and it was first necessary to provide warmth and food. Since our visit on the night before the adults had been there several times and a young rat, two day-old Partridges (*Perdix p. perdix*) and a fledged Meadow-Pipit were lying on the rim of the nest. Upon parts of these we fed the chick. At 9.30 a.m. I was left in the hide, and within a quarter of an hour I heard the cock calling—a “quek, quek, quek”—softly, but rapidly repeated, and a few seconds later he alighted on the nest. He dropped what food he had brought (I could not identify it from a distance) and within five seconds he was gone. The chick called encouragingly, but the cock made no attempt to feed it. At 10.40 a.m. I heard Lapwings (*Vanellus vanellus*) and Redshanks (*Tringa t. britannica*) calling, and presently I could see them mobbing the hen, diving furiously at her, and doing their utmost to drive her away. She paid little regard to them however, and came straight for her objective, over which she hovered, dropping down as the chick called excitedly. The chick snatched the food from her talons, and eagerly attempted to tear it to pieces, watched for a few moments by the hen, who then departed. The chick's efforts were without effect, and as the food was too big to be swallowed whole, the struggle was finally abandoned. Half-an-hour later the hen came in again, but hardly gave herself time to close her wings before leaving, and it was impossible to see whether or not she had brought food. A third visit was made by the hen at 11.40 a.m., and she was as usual accompanied right to the nest by the mobbing Lapwings and Redshanks. The former perhaps had good reason for their hostility, since on this occasion the prey was a half-grown Lapwing. She crashed down with this and was gone. Twenty-five minutes later the cock came in, and remained on the nest for twelve seconds, although, so far as I could see, he did not bring any food. At 12.15 p.m. the cock brought in a young rabbit's hindquarters; at 1.10 p.m. a Pheasant chick. The hen paid visits at 2.40, 2.55 and 3.20 p.m., but these were so rapid that I could not be sure whether food was brought or not. At 4.20 p.m. the cock paid his next visit with a small decapitated rabbit, and seemed in no hurry to leave, but no attempt was made to feed the chick.

At 6.10 p.m. I had a fine view of a food-pass. The cock first called over the nest, but then flew towards some bushes where apparently the hen was perched. As she flew up to meet him she turned over on her back and actually took the prey from his talons. Usually, of course, the food is dropped by the cock and caught by the

hen, but on this occasion the two birds met in the air. At 6.14 p.m. the hen alighted at the nest with food and stayed for several seconds. Her last visit during my watch was at 7.12 p.m., when she did not leave the food, but carried it away in her talons. I left the hide at 8.30 p.m. after an eleven hour watch.

It would be more or less a repetition if I gave a daily and hourly account of the affairs at this nest as seen from the hide. Generally speaking Lapwings and Redshanks would notify the watcher that the Harrier was in the air, so it was unnecessary to keep a careful watch through the small peep-hole; usually, too, the adult would call immediately before alighting, and would be greeted by the chick in an excited manner.

When the chick was 18 days old (for it was the eldest which had survived), the greyish-white down took on a distinct pinkish hue, while the head remained the same colour with a circle of white on the nape. At this age it was seen to take what I believe to be its first meal on its own account. The cock brought in a day-old Partridge, and, after a great deal of gulping, the chick managed to swallow this complete, though for some time the legs of the Partridge remained protruding from its bill. Larger prey was tackled, but unsuccessfully. The chick would hold the food down with its talons—it could not stand, so it rested along the length of the tarsus—and gave sharp, upward pulls with its bill, but it was a futile business, as only small bits of fur or feather were pulled away, and eventually the attempt was given up. When 20 days of age the chick showed the first traces of feathers, which were along the outside edges of the wings, presumably the primaries, and they appeared to be a very dark brown, almost black, in colouring.

On June 27th we spent some time watching the Marsh-Harriers from a dyke-wall a short distance from the nest. We first noticed the birds circling at a great height and saw the cock pass food to the hen in the normal way. Both birds then descended, not in a direct line, but by wheeling round in great circles, until they were about 50 feet above the ground. The cock remained at a higher altitude than the hen, but when immediately above the nest the hen swung up again, rose above the cock, called, and the cock turned right over on his back and took the food from the hen. On June 29th while in company with Jim Vincent we both saw a similar performance. Neither of us had witnessed a hen bird pass food to a cock before, nor have we heard of a case with either the Montagu's or Hen Harriers (*Circus c. cyaneus*). On July 4th, while watching from this same place at 3 o'clock in the afternoon, I saw the cock circling higher and higher, in a manner very similar to the Buzzard. As I watched him another Harrier came into the field of my binoculars, and together they circled round and round each other until they were mere dots in the sky, when they began to descend, still wheeling. The higher bird, which I afterwards identified as the hen from the deserted nest, dropped something from her talons, and the cock turned right over on his back to catch it, but missed. The food went

hurtling towards the ground, and the cock dropped like a stone after it. He failed to overtake it however, and I heard the object hit the ground though I was some distance from it. The cock did not follow it right down, and did not attempt to retrieve it.

On June 29th, when the chick was 24 days of age, I saw it tackle a young Partridge which the cock had brought down to the nest. It still could not stand but gripped the food in its talons while resting along the tarsus, and pulled at the Partridge until it eventually split open. Then pieces were torn from it and swallowed, the chick succeeding in eating it all, head and legs included. It was interesting to note the manner in which it had inherited the same method of dealing with food as its parents, particularly the sharp upward twist of the head and bill as it endeavoured to tear open the prey. It is astonishing how a young bird appears to develop at this stage. Feathers were now well through along the edges of both wings and tail, whereas four days previously the first traces only could be seen on the wings. The white fluff was falling out on the throat and breast so that there were bare spots.

A minor, but nevertheless interesting, point is that these Harriers usually carry the food in the talons of their left foot. I have noticed exactly the same thing with the Golden Eagle (*Aquila c. chrysaëtus*), Buzzard (*Buteo b. buteo*), Kestrel (*Falco t. tinnunculus*) and Sparrow-Hawk (*Accipiter n. nisus*), and with each of the five native owls. I have not seen the talons of both feet used. Generally the food is passed up from the talons to the bill a moment before alighting in order to leave both feet free to clutch the perch. However, it must also be added that I have seen both the cock and hen Marsh-Harrier carrying food in their bills (in some cases while flying at a considerable height), and I have so photographed them.

By July 1st the chick was eating quite a lot on its own, and it became increasingly difficult to keep accurate records of the food brought to the nest. The chick was still anxious for us to feed it, and knew that our visits coincided with its meal-times. On hearing our approach it would begin to call, and became very excited as we neared the nest. On one occasion it was so keen to be fed that it started to crawl towards us and in doing so fell over the front edge of the nest into the water below. It was now able to stand for short periods, spending much time in preening and combing itself, and feathers were beginning to grow at the base of the shoulders. When it became very hot during the middle of the day the chick, finding no shelter in the nest, wandered into the surrounding sedge and for long periods I could see only an empty nest from my position in the hide.

On this same day (July 1st) a record number of visits to the nest was made by the adults, who actually came eight times in two hours. These visits included three by the cock in seven minutes, on each of which food was brought, which made me wonder whether he had a well-stocked larder nearby.

On July 5th, Ian Thomson spent the day in the hide, so Jim Vincent and I watched from our usual position on the dyke-wall and saw a

remarkable display flight. The cock began by circling higher and higher, then dropped like a stone to within a few feet of the ground, rose again, and with very slow flapping wings wheeled round in circles, gaining height all the time. He continued this ascent until he became a mere speck in the sky, then, closing his wings, he just fell down through the air, spiraling in quite small circles until it appeared that he would crash into the marsh before he straightened out. He repeated this performance. We presumed that one of the two hens was perched within his sight, though at the time we could not see her, and that he was displaying to her. This proved to be the case, as we later saw a hen rise to meet the cock, and then from a westerly direction appeared the second hen who also flew towards the cock. Jim Vincent told me that this was the first occasion that he had seen a cock Marsh-Harrier displaying in July or even after the young had hatched.

No doubt owing to the neglect on the part of the adults the chick came to rely on us for food, even though it was now able to consume quite a large amount on its own, and it certainly paid more attention to us than it did to its parents. One incident will remain in my memory for a long time. It was on July 9th. I visited the nest as usual to feed the chick, but there was no trace of it on or near the nest, so I called to it and received a reply immediately. Then the chick came running towards me from a point quite 12 yards from the nest along a track in the sedge, and as I was kneeling down by the nest cutting up the food, it jumped up on my shoulder, then down on to my knee where I was able to feed it.

For some days past men had been clearing the prolific growth of vegetation from the waters of the dykes, and on July 14th began working within 50 yards of the nest, thus keeping the adult Marsh-Harriers away altogether. As a result we had to supply the food as well as feed the chick. Normally we might have experienced some difficulty in catching this food ourselves, but as I was studying a pair of Barn-Owls (*Tyto a. alba*) at this time, which were supplying their young very liberally with field voles—often eight or nine could be found at the nest at one time—we took some of these to the Marsh-Harrier chick. Once the men had finished their work on the dyke and left the vicinity the cock began to revisit the chick.

By now the hen had lost all interest in the young, and deserted the nest altogether. Fortunately, however, the cock continued, and, with the exception of the days when the dykes were being cleaned, visited the chick every day until it could fly. The chick now wandered considerable distances from the nest, and on July 16th was 18 yards from it. When the cock brought in food he would drop it by the chick, which added to our difficulty in finding and recording it. On July 17th, when I went over to feed the chick the cock circled overhead calling, and although I spoke, the chick did not answer, nor did it come to me. I could find no fresh food, and was about to leave when the cock flew from sight. I called the chick again, and this time it not only answered but came bounding over the sedge

towards me. I can only presume from this that the cock had warned the chick of my presence, and that it had consequently remained in concealment, but on the disappearance of the cock had assumed the danger was past.

We had hoped to stay long enough to see the chick on the wing, when we felt sure that it would join the cock. Unfortunately, it was impracticable for us to do this, and, just before leaving, we made arrangements with a local resident who had volunteered to take food over to the chick as long as it was necessary. In company with this gentleman we paid our last visit to the chick on July 21st, and as we neared the nest the cock bird flew over our heads calling. Whether it was due to this warning or to the presence of a stranger I cannot say, but the chick jumped into the air and took its first flight of about five yards. It was then 45 days of age. Three weeks later Jim Vincent reported that he had seen the bird flying strongly, and we felt amply rewarded for the trouble we had taken on its behalf. It can be imagined that the whole episode was a source of some satisfaction to us since, in addition to securing a unique series of photographs, we had been able to play a part in rearing what was in all probability the only Marsh-Harrier chick in the British Isles to attain adolescence in the 1942 season. The chick was ringed so that it might be identified in the future.

Analysis of the Food brought to the Nest from 22nd June to 20th July, 1942.

- 29 young Pheasants (*Phasianus colchicus*).
- 21 young Partridges (*Perdix p. perdix*).
- 8 young Red-legged Partridges (*Alectoris r. rufo*).
- 7 fledged Meadow-Pipits (*Anthus pratensis*).
- 2 young Moorhens (*Gallinula c. chloropus*).
- 1 young Mallard (*Anas p. platyrhynchos*).
- 1 young Lapwing (*Vanellus vanellus*).
- 1 young rat.
- 15 rabbits or parts of rabbits.
- 5 adult water-voles.
- 7 adult field-voles.
- 7 leverets.
- 2 unidentified passerines.

This equals 71 birds, in all cases young, and 35 mammals brought to the nest in 28 days. As explained above, this must not be taken to be an accurate list, since once the chick had reached a certain age it was able to take food of its own accord, and may have swallowed it complete. Moreover, in the later stages some food was dropped in the surrounding sedge where we were unable to locate it.

AN INVESTIGATION INTO THE ROLES OF MALES IN RELATION TO INCUBATION

BY

LT.-COLONEL B. H. RYVES.

IN response to the Editor's request, I will endeavour in this paper to throw some fresh light on the subject of *Incubation*, of which we appear to have far from a full understanding. I claim no more than an attempt to probe into a subject of great complexity and yet surely of outstanding importance, and one which still offers an almost inexhaustible field for patient study and research.

While looking up the volumes of the *Handbook* for possible additional data to the Breeding sections, I came upon entries, under a number of species, couched in the words "male occasionally incubates" or words conveying a like meaning.

I wrote to the Editor drawing attention to what seemed to me to be a misleading use of the word "incubate" and pointing out that the wording under British Stonechat, was more accurate. I quote the wording: "a few definite records of males on eggs" (vol. ii, p. 174). This expression, I submitted, avoided an "incubation pitfall." I further suggested that a clear distinction should be drawn between steady incubation and casual brooding which may take place before incubation proper starts and may be observed occasionally in males of species in which the male does not, in my experience, incubate in any real sense.

Incubation, as I see it, is the operation by which the eggs are subjected to the requisite temperature to permit their development.

Prior to incubation a bird undergoes definite physiological and other changes, one of the most important of which, in at any rate the majority of species, is the development of incubation- or brood-patches.* There is no evidence that in the absence of these changes a bird is physically capable of steady incubation or of keeping the eggs sufficiently warm for development to proceed. On the contrary, as mentioned under Case 6 below, after a male Blackbird had brooded eggs for 35 minutes they were still almost cold.

Brooding, either before genuine incubation begins or casually by males of species in which the female normally performs the whole of the incubation should therefore be distinguished from incubation proper and should be understood to mean "to sit on eggs without the production of the requisite temperature to further their development."

I think it might be misleading to attempt to lay down any clear-cut formula for distinguishing between "steady incubation" and "casual brooding." A measure of field-sense coupled with and engendered by *intensive observation* can alone draw the distinction with reasonable accuracy and reduce errors of judgment

*Mr. B. W. Tucker, who has advised me on this point, states that he intends to enter more fully into the subject in a future number. B.H.R.

to a minimum. Broadly speaking, however, "steady incubation" is evidenced by regularity in sitting shifts and regularity in the periods of absence for feeding. On the other hand, "casual brooding" is usually irregular and haphazard and is not uncommon, in the early stages, among females of a number of species. It is only when such brooding gives place to incubation proper that development of the eggs commences.

In the following pages, wherever I use the words "incubation" or "brooding," they are to be read as conveying the meanings described above.

In this article I shall be dealing with only one aspect of the subject—the reactions and rôles of *males* in relation to incubation, with special reference to occasional brooding by males.

In this connection species can be grouped into three distinct categories:—

Category 1. Those in which the females undertake incubation and males may occasionally be observed brooding the eggs.

Category 2. Those in which the males undertake a definite and proved part in incubation throughout the period (sea-birds, waders, certain hawks and others).

Category 3. Those in which the male alone undertakes incubation (Phalaropes).

I shall concern myself with the males of Category 1 only. The other two Categories are outside the scope of this article, except for illustrative references to two birds of Category 2.

After courtship and pairing, marked reactions among the males to the next important event in the breeding cycle—nest building—are discernible. Then follows a quiescent period until the eggs are laid, when a resurgence of excitement becomes evident. This excitement or, to the human mind, "enthusiasm," progressively diminishes as incubation advances.

In the illustrations taken from my own experience, which will follow later, the various forces at work within the birds will emerge. There is the natural attachment to their eggs which is occasionally demonstrated by the male birds to the extreme point of brooding them. Further, there are circumstances under which a male may be induced to shelter or protect the eggs by brooding during the female's temporary absence. And finally there are actions of enticement of and encouragement to a nervous female. The males of many species appear to be more placid in temperament than females. The mere presence of the male often engenders confidence in the female. All these points come out clearly in the illustrations.

If the male of species in which the female normally incubates alone is believed to be incubating on the rare occasions he is seen on eggs, one is forced to the conclusion that Nature suddenly endows him with the powers of incubation only to deprive him of them as suddenly! Such a supposition surely is untenable? If on the other hand he has permanently acquired incubation powers

but fails to use them, we are confronted with an equally untenable argument, because the urge to incubate would surely be so irresistible that he would take his share with the female at systematic intervals. In short, he would belong at once to Category 2.

We believe that birds are not in the physiological condition necessary to perform incubation at all times of the year. They acquire it only at the psychological moment. We also know that the condition is not always fully developed even when the clutch of eggs has been completed: incubation is consequently postponed.

Although I have done much intensive work with a number of species over a considerable period of years, the definite records I have secured of males brooding eggs are limited to those contained in the illustrations. So it must be clear that occasional brooding by males is not commonly encountered. But the records in *The Handbook* show that it occurs in other species than those I have noted. Indeed, I think it perfectly possible that, in the course of prolonged observations, it may be found in still more species.

Here then, at last, are my illustrations:—

1. CHAFFINCH (*Fringilla caelebs gengleri*). While watching a nest with full clutch of eggs, the female was seen to leave and fly to the valley below. The male, who had been singing nearby, flew to the nest and settled on the eggs. He remained on the eggs for three minutes and then flew off to join the female.

2. GREAT TIT (*Parus major neotoni*).—The female was killed during incubation. The male, for several evenings following, entered the nest-box and remained for the night. He left the eggs uncovered and I never saw him in the box during the day. One can only surmise that he had a peculiar attachment to the now worthless eggs and found difficulty in tearing himself away finally from all connection with the nest. Since the weather was warm at the time, the need to roost in a hole can hardly have been the cause of his behaviour.

NOTE. I have a record of a female whose male disappeared during early incubation, successfully hatching the eggs and rearing the brood single-handed. If the male had had incubation powers, he could have tried to do the same.

3. MISTLE-THRUSH (*Turdus v. viscivorus*).—Early stage of incubation. The male called off the female, but, instead of accompanying her, flew to the nest and settled on the eggs where he remained for six minutes before joining his mate.

NOTE.—Although this is my only record of actual brooding, I have frequently seen the male, after the female has left to feed, fly to the nest and inspect the eggs for a few seconds. I have similarly seen him inspect the nest during building.

4. BLACKBIRD (*Turdus m. merula*).—Nest high in a corner. Incubation at an early stage. A bird on the eggs, which proved to be the male. The female returning from normal feed, alighted by the nest and the male scrambled out of it. At the second nest

of the same pair in the same tree. Early stage of incubation. The female left the eggs to feed; the male quietly slipped on to the eggs; about fifteen minutes later the female returned from feed and the male, hearing her approaching, hurriedly fled.

[NOTE.—Both nests were intensely observed, but no further visits by the male were recorded.]

5. BLACKBIRD (in inclement weather).—Nest high in a pine. A bitterly cold day in early April with a biting north-east wind blowing. I saw the female quit the eggs to feed but, instead of flying off to a field, she searched for and found her mate, whom she viciously attacked and apparently drove to the nest, where I saw him settle down on the eggs. The female returned in a quarter of an hour and resumed her normal task of incubation, the male at once flying off. This performance I saw repeated once again that day and twice the next day. After that, the weather improved and the female carried on her job normally.

[NOTES.—The weather was also very dry, the ground hard and food difficult to procure. I think that the female's feeding absences were, in consequence, stretched to the limit. On the two critical days, but for the male's action in sheltering the eggs from the bitter wind, the eggs might have become dangerously chilled. The problem one might imagine, could have been solved by the male feeding the female on the nest, but this is not the method of Blackbirds (I have only two records of it) and apparently the habit could not be broken.

On the other hand, a male Greenfinch I have little doubt, would, in inclement weather, feed the female on the nest instead of calling her off for the purpose which is his normal procedure. A male Goldfinch would act likewise. In fact, I have watched a nest for several hours when a southerly gale was blowing and severely buffeting it. The female did not quit at all and was fed by the male at regular intervals.

To learn behaviour of birds, during incubation, in really bad weather, observation would not only be extremely difficult, but also most uncongenial.]

6. BLACKBIRD (? enticement).—At a nest under close observation, the female laid her last egg on April 8th and began incubation. On the 19th and 20th, I noted long absences from the eggs with the result that they felt cold to the touch. On the 22nd, after a period of sitting, the female had been absent for nearly an hour when I saw the male make his way to the nest and settle on the eggs. He brooded for 35 minutes and then left. I at once felt the eggs and found they were still almost cold. The next day (the 23rd), I examined the eggs and found they contained half-formed chicks which should have hatched about the 21st.

[NOTE.—It seems evident that the female's capacity for incubation had broken down prematurely for some reason and the urge to incubate had ceased. Whether the male's behaviour should be considered as an attempt to entice the female back to the eggs

or as merely a sort of compensatory reaction (though an ineffective one) to her absence is hardly possible to say.

Here I may be allowed to digress for a moment. My description of the female's breakdown is given support by our knowledge that birds do not appear to be able to discover that their eggs are infertile, for they will continue to sit for many days beyond the normal period. This Blackbird deserted when hatching was due. This over-time sitting may be explained by the assumption that the capacity for incubation is not lost for some time after hatching and may be necessary for brooding naked and immature chicks. As soon as the urge to incubate passes, the bird deserts.

7. MONTAGU'S HARRIER (*Circus pygargus*) (enticement).—I was in my car observing a nest (at seventy yards) in which the female was incubating her first egg. The male arrived, called the female off and passed the kill to her. After circling over the nest, he settled on a post to watch her return. (I don't think I have ever observed a male leave the vicinity of the nest until he has watched the female go back to her eggs).

Whether the female was suspicious of my car I do not know, but she was reluctant to return and the male obviously became impatient. He took wing and dropped to the nest, remaining for a few seconds only, and then rose and returned to his post. The female remained unmoved. The male repeated his manoeuvre but with the same result. The third time he stayed on the egg, but, after five minutes, the female left her perch, circled over the nest and, "kiking" angrily, almost pounced down to her egg. The male calmly rose and forthwith departed.

8. MONTAGU'S HARRIER (encouragement). At another nest, I flushed the female to count her clutch. Instead of soaring high overhead and "kiking," she flew fast and low till completely out of sight. Fifteen minutes later, I saw the male approaching with the female behind him. When they were over the nest the male circled round it, but his mate flew on. Finally the male got into position, and was obviously about to settle when he was anticipated by the female, which brushed him aside and dropped to the eggs. Having calmed the frightened female, the male disappeared to continue his hunting.

Now let us contrast the circumstances and impulses which have moved the males described in the above illustrations to brood their eggs with the deliberate and purposeful actions of the genuine incubating male. Two examples will suffice :—

WHITETHROAT (*Sylvia c. communis*). Female on her eggs. Male feeding in the offing with occasional bursts of song. Presently he is seen approaching. He flies with precision towards the nest and alights on his "diving-perch," scrambles down it and disappears into the herbage. Instantly the female emerges, takes wing and is lost to view among the bushes. An hour or so later, the female arrives, and, in like manner, relieves the male. And so it goes on throughout the days of incubation. No doubt is left in the watcher's mind that each bird is performing the task of incubation.

WOOD-PIGEON (*Columba p. palumbus*).—Female on her eggs. Male arrives and alights nearby. Often he is in no hurry and for half-an-hour may perform a thorough toilet. The female sits tight. Eventually the male flies or walks along a branch to the nest. The female quietly moves off the eggs and takes wing, usually with a wing-clap. Several hours later, she returns and relieves the male in like manner.

I am certain that I have now made it abundantly clear that there is a very wide field open to all ornithologists to supply a great deal more information on a subject of major importance. Which species, for instance, definitely belong to Category 2 and which to Category 1?

In addition to the species here recorded, the following from my own personal observations, may be classified in Category 1 :—

Raven, Carrion-Crow, Rook, Magpie, Chough, Greenfinch, Goldfinch, Linnet, British Bullfinch, Corn-Bunting, Cirl Bunting, Wood-Lark, Sky-Lark, Meadow-Pipit, Rock-Pipit, British Tree-Creeper, British Nuthatch, British Blue Tit, British Coal-Tit, British Long-tailed Tit, British Goldcrest, Cliffchaff, Willow-Warbler, Wood-Warbler, British Song-Thrush, British Stonechat, British Robin, British Hedge-Sparrow, Wren, British Dipper and Common Snipe.

I have no records of occasional brooding by the male of any of the above species, but there are records by other observers for some of them in the *Handbook*. But, as I have already stated, it is, in my opinion, possible that records may be obtained in the future for any or all of them, as well as for other species probably belonging to Category 1 which I have omitted because I have named only those of which I have personal knowledge.

There are some other species mentioned in the *Handbook* where it does not seem absolutely clear that the male takes some genuine part in incubation. The male's part in some of these may not amount to more than the occasional brooding, which we are now discussing. Such birds call for more intensive study which would amply repay observers and enrich ornithology. Here is a list of at least some of them :—

Hooded Crow, British Jay, Hawfinch, Lesser Redpoll, Reed-Bunting, Snow-Bunting, House-Sparrow, Marsh-Tit, Spotted Flycatcher, Pied Wagtail, Sedge-Warbler, Garden-Warbler, Dartford Warbler, Wheatear, Redstart, Swallow, Sand-Martin, Swift and Wryneck.

HOUSE-SPARROW (*Passer d. domesticus*).—I have myself closely observed only two nests, at neither of which did I record the male incubating or brooding the eggs. In view of the *Handbook* record, I have omitted the species from my own list for further investigation.

SPOTTED FLYCATCHER (*Muscicapa s. striata*).—I incline strongly to the belief that this bird belongs to Category 1, but I have earmarked it for closer study.

PIED WAGTAIL (*Motacilla alba yarrellii*).—Although I have a few records of a male on eggs and have also twice seen a male relieve

the female in Whitethroat fashion; I have had no favourable opportunity of noting continuity or otherwise of reliefs and of duration of sitting and feeding shifts.

There appears to be plenty of evidence that the males of both the Grey and Yellow Wagtail take part in incubation. There is evidence also for the White Wagtail and one might expect that, being a very close sub-species, it would not act differently from the Pied.

Nevertheless, I think that the Wagtail family generally call for further and more detailed observation.

Generally speaking, with birds in Category 2, reliefs on eggs are effected rapidly, the sitting bird remaining at the nest until the other is known to be approaching or has actually arrived at the nest. A *deliberate relief* in a species not definitely classified would, in my opinion, be an important clue, but, of course, this should be followed up by further observation.

A single record of a male sitting on eggs for a long spell would certainly suggest that he was incubating. But I do not think that this would in itself offer conclusive evidence for classification in Category 2.

One must not overlook the possibility of a male of a species of Category 1 acting exceptionally and abnormally by sitting on eggs for a long period or repeatedly, but such behaviour would not, I submit, warrant the transference of the species as a whole to Category 2.

The case of the Rook recorded in *British Birds*, Vol. xxxiv, p. 44, is interesting, but unfortunately it is not known for how long the male sat. Nor, apparently, was continuity of behaviour recorded. It appears that there was no *deliberate relief*, for the male arrived at the nest in the ordinary way with food for the female which he duly delivered. Had he come to take a definite shift on the eggs, he surely would not have brought a meal for the female. As the record stands, it seems clear to me that the male was only brooding.

Finally, I record my gratitude for my wife's help and guidance in my efforts to write this article. She has been my constant companion and fellow-worker on many a wonderful day among birds.

NOTES.

WOOD-LARK BREEDING IN ESSEX.

As *The Handbook of British Birds* states that the Wood-Lark (*Lullula a. arborea*) does not apparently now nest in Essex, it is perhaps worth recording that on April 11th, 1943 I found a nest of this species on a piece of rough ground a few miles south of Colchester.

G. K. YEATES.

[In *A History of the Birds of Essex* (1929) W. E. Glegg states that at one time the Wood-Lark was well known in Epping Forest, but became extinct there about the middle of last century. No other dated breeding records are given and the last bird recorded as seen in Essex was in Epping Forest in November 1905. It seems possible that the bird may have been present in the county very locally and been overlooked. Mr. Yeates's discovery is of interest.—EDS.].

REDWING SINGING FULL SONG IN BRITAIN.

On April 13th, 1943, on the Isle of Tanera, off the west coast of Ross-shire, a Redwing (*Turdus musicus*) was seen and heard singing in a row of apple trees. The bird was accompanied by another. The song was of the thrush-like type recorded by Thompson and VENABLES in the *Handbook of British Birds*, Vol ii, p. 122. It had some resemblance to the continuous, excited song of a fighting thrush, but, though some chuckling and harsh notes were incorporated, was richer, fuller, more musical and quite distinctive. In view of the statement in the *Handbook* that the full song has not certainly been recorded from the British Isles, the above note may be of interest.

AVERIL MORLEY AND F. FRASER DARLING.

[This still appears to be the only clearly recorded case of the full song being heard in the British Isles. Even in the case of Mr. A. H. DAUKES's Scottish breeding record (*antea*, Vol. xxvi, p. 132) the recorder heard only the simple, short and monotonous form of song, which even in the normal breeding area is so much more often heard.—B. W. T.]

DISPLAY OF MERLIN.

On March 11th, 1943 a male and female Merlin (*Falco c. aesalon*) flew past me keeping close together and calling as if at the nest. They landed on the branch of an oak tree and chased one another up and down the branch for about ten minutes, moving sideways with tails fanned and depressed. Sometimes they would jump up from the branch, fluttering together with wings partly raised like cocks fighting, then settle on the branch again and begin the hopping chase, first one chasing, then the other. After coition both birds sprang into the air and gave a magnificent aerial display lasting nearly an hour. They kept very close together, appearing almost touching and flew straight up 5-600 ft, then making a rapid turn simultaneously, swooped down at tremendous speed, one above the other, the male usually, but not always, on the top. At tree top level they turned again and repeated the performance. The

following day about the same place a Merlin was seen to kill a Lapwing, then lift it from the ground and carry it over a quarter of a mile.

D. STUBBERT.

DISPLAY OF BLACK-THROATED DIVER.

As little seems to have been recorded concerning the display of the Black-throated Diver (*Colymbus a. arcticus*), the following description of a form of communal display may be of interest. The observations were made in April and May, 1942, close inshore on a sea-loch in Wester Ross.

On the evening of April 26th, my attention was attracted by splashing and calling on the loch, and four divers were seen chasing each other in a circle on the water, with necks outstretched, and repeated cries which sounded like kraa-wook or kraa-o wa-o.

I watched for the birds subsequently, and on the 29th (a calm bright evening) at 9.30 p.m. about three quarters of an hour before sunset—a pair of divers which were on the loch began calling. A mournful wail was uttered three times, then a loud kraa-wook repeated six or seven times. After about a minute's silence, a second pair of birds appeared flying and settled on the water beside the first. The divers now "skated" (in a similar manner to Mergansers but slower) in line, four abreast along the water, with necks extended forwards, and wings half raised and held stiffly arched away from the body, repeating the call of kraa-wook several times. The two pairs then swam quietly for about two hundred yards, when the performance was repeated. One pair then flew out of sight and nothing more was heard except a few wailing calls from the remaining pair which were answered from the distance, presumably by the other.

Calling was heard again on the nights of April 27th and May 1st, but no further display behaviour was observed.

Further study is desirable, but these few observations will amplify *The Handbook* descriptions. It would seem that there is in this species a form of display similar to the "Plesiosaur Race" described for the Red-throated Diver (*C. stellatus*), of paired birds, early in the breeding season, induced by the proximity of two or possibly more pairs.

IAN D. PENNIE.

GOLDEN ORIOLE IN NORTHUMBERLAND. Mr. R. Perry writes that during a moderate gale on May 8th, 1943, an immature male Golden Oriole (*Oriolus o. oriolus*) appeared on Holy Island.

EARLY NESTING OF TREE-PIPIIT IN WILTSHIRE.—Major W. M. Congreve writes that Major S. Maples found a nest of a Tree-Pipit (*Anthus t. trivialis*) on the Wilts Hants border on April 25th, 1943. The nest contained three eggs and on the 27th five, when incubation began. The first arrival of the Tree-Pipit in the district was noted on April 8th. There are several records of eggs in the first week of May, but we are not aware of any in April. A record of young in the nest on April 17th quoted by Coward on the authority of S. G. Cummings must have been due to a faulty identification.

EARLY CHIFFCHAFFS, HOUSE-MARTINS AND GREENLAND WHEATEAR.—The following have been noted in 1943:—Chiffchaff (*Phylloscopus collybita*)—one near Ampleforth (Yorks) on February 18th (*Field*, April 17th, p. 409), one at Caerleon (Monmouth) on March 5th (Bruce Campbell). House-Martin (*Delichon urbica*)—three at Fetcham (Surrey) on March 29th (Miss H. V. Virgo). Greenland Wheatear (*Ænanthe æ leucorrhœa*)—one on Romney Marsh (Kent) on April 4th (H. F. Ticehurst).

ROBIN'S NEST IN BOX BUSH.—Major W. M. Congreve records a nest of Robin (*Erithacus rubecula melophilus*) found on April 19th, 1943, 3 ft. 8 ins. from the ground in a box bush in a private garden and containing five eggs. Such a site is very unusual, but nests have been recorded in holly, fir, spruce, cypress and yew.

ADULT MALE SMEWS IN NOTTINGHAMSHIRE.—Mr. R. J. Raines writes that he and others watched an adult male Smew (*Mergus albellus*) on a lake near Netherfield on January 8th, 1943, while on the 15th there were two and one remained until February 14th.

Dives on average were of 20 seconds, while some of 23 and one of 25, were noted.

BEHAVIOUR OF GREEN AND WOOD-SANDPIPERS.—With reference to Mr. T. C. Gregory's note on remarkable antics of Green Sandpipers (*Tringa ochropus*) in autumn and his remark that he had not seen Wood-Sandpipers (*Tringa glareola*) behave similarly (*antea*, Vol. xxxvi, p. 181), Gunner C. A. White, on active service in North Africa, writes to us that at Slough Sewage Farm in 1939 he saw a Wood-Sandpiper (one of a party of three) behave in just the manner described, comprising actions 1 to 4 (inclusive) of Mr. Gregory's account, but not, to the best of his recollection action 5, alternate swimming and diving.

ICELAND REDSHANKS IN KENT IN APRIL.—Dr. J. M. Harrison writes that he has examined two female Redshanks killed in the Sevenoaks district on April 10th, 1943, the advanced summer-plumage and size of which showed them on comparison to be of the Iceland form (*Tringa t. robusta*). This appears to be the latest spring date recorded for definitely identified examples of this form.

GLAUCOUS GULL INLAND IN NORTHUMBERLAND.—Mr. H. Tully informs us that he saw an immature Glaucous Gull (*Larus hyperboreus*) on November 16th, 1942 at Newcastle-on-Tyne about eight miles from the sea and another on the 24th at Newton Hall, Stocksfield, about twenty miles inland. The latter was eating a rabbit.

ICELAND GULL IN CARDIGANSHIRE.—Mr. J. L. Davies has sent us details of an immature Iceland Gull (*Larus glaucoides*), which he observed between February 4th and March 14th, 1942 at Aberystwyth. On February 18th, 1943 on the same stretch of beach he again saw an Iceland Gull, which he thought from its stage of plumage and because it frequented the same spot was probably the same individual as that seen in the previous year.

REVIEW.

Bird Display : An Introduction to the study of Bird Psychology. By Edward A. Armstrong. (Cambridge Univ. Press, 1942). Illustrated: 21/- net.

THIS is certainly one of the most useful and welcome bird books that have appeared for a long time, and should take its place amongst the quite small minimum number of books which every serious student of bird life and behaviour ought to possess. For a number of years bird display has been attracting increasing attention, and an adequate general work on this fascinating and biologically important subject was much needed. The literature is extensive and in several languages, and in addition to the significant studies of such biologists as Howard, Huxley, Lack, Tinbergen and others, which have contributed towards a proper understanding of the nature and functions of display, a great many observations of a more casual or less comprehensive kind, but often of much interest and value, are scattered through the pages of numerous ornithological journals and other works. A satisfactory synthesis of this, in part, somewhat incoherent mass of data is not easy and requires a combination of field experience with a knowledge of modern work and views on animal behaviour and some acquaintance with the general principles of physiology, which is unfortunately none too common amongst ornithologists.

In the main Mr. Armstrong has fulfilled his task very well. It is not to be expected that the experienced student of bird behaviour will agree on every detail of interpretation or emphasis, but we have here a critical and readable presentation of the ceremonial behaviour of birds in its proper biological and psychological setting which should be most valuable to field workers and can hardly fail to stimulate interest in the subject. In the preparation of the work the literature seems to have been very well searched, though the author has profited much from the spade-work of others, and we have noticed few omissions of any importance. The subject is introduced by an account of the ceremonial activities of the Gannet, and, taking this as his text, so to speak, the author then proceeds to deal with the different types of emotional and formalized behaviour in birds in general. Display is interpreted, as it should be in such a work, in a broad sense, and the phenomena of song, territory, nest-building, social behaviour and so forth are discussed in relation to it. The author's acquaintance with comparative and human psychology enables him to draw some instructive parallels from other groups. While duly avoiding the bogey of anthropomorphism he also brings out in an interesting manner common attributes in basic emotional make-up and "ritual" behaviour between man and lower vertebrates. Finally current views on the biological and physiological significance of display are discussed.

There are a few minor points which should be corrected in any future edition. It is a little disconcerting to find the well-known "Native Companion" or Australian Crane referred to on p. 185 as a "stilt-bird," while the reference to the Lapland Bunting by this name on p. 327, but on p. 108 by the American equivalent of Lapland Longspur, as if this was something different, may puzzle some. In a few instances the author is a little incautious in generalizing single observations into characteristic behaviour for the species, as in the presentation of Seigne's account of a nest-relief ceremony of Woodcock, where either the behaviour was abnormal or (more probably) the subsequent change-over on the nest was an error of observation, since the male Woodcock does not normally incubate. It is a pity, too, that the story that Rowan's Crows with gonads enlarged to the spring condition in winter went north when released, "fulfilling the spring migratory impulse", should crop up again here. Without considerable qualification this statement is misleading, as the present reviewer pointed out some years ago (Vol. xxxii, p. 55).

But these are not matters of major importance, and it may be hoped that to many observers of birds the author has opened up a whole new field of extraordinary interest. It should be added that the book is thoroughly indexed, has a full bibliography, and is well illustrated with photographs.

B.W.T.

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BROOD-PATCHES AND THE PHYSIOLOGY OF INCUBATION

BY

B. W. TUCKER, M.A., M.B.O.U.

THE present paper is prompted by Lt.-Col. B. H. Ryves's interesting communication on the rôles of male birds in relation to incubation (*antea*, pp. 10-16). It provides no new data, but merely aims at summarizing for the benefit of those interested some ascertained facts with regard to incubation which have relevance to Col. Ryves's conclusions. This seems the more desirable because some of the data which will be referred to are not very easily accessible to field workers in the original sources and are not widely known. It must not be understood, however, that all the essential facts have been recorded and only need to be put together in order to produce a complete picture. On the contrary, the account which it is possible to give will serve also to draw attention to some considerable gaps in our present knowledge.

Col. Ryves has argued that when male birds of species in which that sex does not normally incubate are occasionally found on eggs this is no ground for asserting, as has been done, that such males "occasionally incubate." In other words sitting on eggs does not necessarily constitute incubation. "Prior to incubation", he observes, "a bird undergoes definite physiological and other changes" and "there is no evidence that in the absence of these changes a bird is physically capable of steady incubation or of keeping the eggs sufficiently warm for development to proceed." It may be said at once that although not all the data that are desirable are in fact available there is every reason to believe that this view is correct, and we may now proceed to examine the grounds for this conclusion.

The most striking change undergone by the majority of birds in connection with incubation is the development of specially modified areas of bare skin known as brood- or incubation-patches. Feathers are bad conductors of heat and the brood-patches are clearly adaptations providing for the closest possible application of the eggs to the warm surface of the body, and, what is more, to an area rendered particularly suitable for the purpose by a heightened blood supply and the other changes to be described. The principal modern studies of the subject are those of Lange (1928), to whom we owe an excellent account of the histological changes just mentioned, as well as exact descriptions of the form and extent of the patches in the limited number of types which he studied, and of Koutník (1927), who described in detail the changes involved in the development and subsequent regression of the brood-patches of the Fowl. These are the main, though not the only, sources of information for the general accounts in Stresemann's monumental work on the Aves in the *Handbuch der Zoologie* (1934) and in Groebbel's

Der Vogel (1937), which have also been consulted in preparing this account.

In some types of birds, such as passerines, birds-of-prey, grebes and pigeons, there is a single median brood-patch. In others, such as waders and gulls, there are a pair of lateral patches and a median posterior one. In the gallinaceous birds there are also three patches, but the median one is between rather than behind the other two, with which it becomes more or less confluent. It may be recalled that in the great majority of birds the contour feathers arise from definite tracts or pterylae, separated by areas called apteria, which in some types are covered with down and in others practically naked. In the main the brood-patches arise in the apteria, and in groups like the birds-of-prey, in which the apteria are downy, the down is shed from the region of the brood-patch or patches by a special local moult. In a considerable measure the extent of the brood-patch is determined by the extent of the apterion, but in some cases the brood-patch encroaches on the adjacent feather tracts, involving the shedding of some of the contour feathers.

It has been mentioned that increased vascularization is one of the features of brood-patches. This is brought about, according to Lange, both by increase in number and by widening of the blood-vessels, and Koutník describes in the Fowl how these vessels, including both arteries and veins, but especially the latter, interlace and run together to form a spongy layer near the surface. This is often accompanied by a loosening of the tissues and by multiplication of the cells in the spaces between the connective-tissue fibres. The feather papillae disappear from the area except at its edges, the smooth muscle fibres degenerate, and as a rule, though not invariably, any subcutaneous fat disappears.

It will thus be evident that the brood-patches are very much more than mere bare areas of skin, and the principal changes in the tissues are, as Stresemann observes, very similar to those which occur in inflammation. The importance of these changes is obvious. The increased blood supply appreciably raises the temperature of the brood-patch as compared with the rest of the body surface and the loose, flabby, and wrinkled skin can be more closely applied to the eggs than would otherwise be possible. Since the development of the brood-patches is clearly adaptive, it may appear surprising that there should prove to be little correlation between their area and the number and (or) size of the eggs. In actual fact, as already mentioned, the extent of the apteria appears to be the main determining factor, and particular arrangements of the patches characterize particular groups irrespective of specific differences in the size of the clutch. It must be supposed that the modified region is at any rate not *less* than is needed to provide the extra warmth that is required. Nevertheless, it must be mentioned that a few birds have no brood-patches at all. This is the case in the Cormorants (*Phalacrocorax*) and Gannets (*Sula*). The Gannet, however, covers its egg with its webbed feet, which serve the same function as brood-

patches. The webs of most, if not all, swimming birds are especially warm, being kept so by the special device of short-circuiting connections between the arteries and veins. This makes possible a much more rapid circulation of blood than can take place when it has all—as normally—to pass through the fine network of microscopic capillaries, and the efficiency of the arrangement is testified by the ability of ducks and gulls to stand without apparent discomfort on ice. What enables the Cormorant to dispense with brood-patches is, however, not known. An exceptional state of affairs is also found in the ducks and geese. Here again there are no brood-patches, but the female denudes her breast of a great deal of down to form the nest, and this down surrounding the eggs no doubt plays an important part in preventing dissipation of heat, which otherwise seems to be considerable (*cf.*, p. 27).

In spite, then, of one or two anomalous cases which need further study, it cannot be doubted that in the vast majority of birds the brood-patches are an important factor in incubation. This is confirmed by the fact that they are only found in the incubating sex in cases where the partners do not share this duty. That this is the general rule is certain: whether it is absolutely invariable and whether the presence of brood-patches in both sexes is alone absolute proof that both sexes regularly take part in incubation cannot be stated categorically, since for a large proportion of our birds published data on the occurrence of brood-patches in the two sexes is singularly deficient. But it is highly probable that this is the case. For the waders the late Dr. C. B. Ticehurst, that most active minded and indefatigable observer, has published a useful table (1931) giving such data for 35 species and in a parallel column particulars quoted from the *Practical Handbook* as to whether one or both sexes incubate. In a few cases where this information was lacking or uncertain later observation has confirmed the conclusion which the brood-patch data indicated, and the agreement is almost perfect throughout; where both sexes have brood-patches both are known to incubate, where only one sex does so, *e.g.*, male Red-necked Phalarope (*Phalaropus lobatus*), only this sex has the patches. Only in the Spotted Redshank (*Tringa erythropus*), is there an apparent discrepancy, both sexes having brood-patches, though according to Jourdain in the *Handbook of British Birds* "all direct evidence goes to show that only male incubates." This evidence, however, is slight, and it will probably turn out that the female takes some share. It is clear that accurate data on brood-patches and their incidence in the sexes ought to be recorded for all species.

The development of brood-patches is the most outstanding change of a physiological character associated with incubation. The idea formerly entertained that they were induced by friction with the eggs in the process of incubation need not be seriously considered, for it is now fully established that the feathers are shed and the other changes at least begun before incubation starts. It is therefore evident that their development, along with that of

various other sex characters, is hormonically controlled, though whether the internal secretion concerned is produced by the gonads or the pituitary remains to be established.

Up to this point temperature has been referred to only incidentally, but as it is clearly the key factor in connection with incubation something must now be said on the subject of temperature in birds. It has been concluded above on the strongest circumstantial evidence that brood-patches must play a really important rôle in incubation, but various questions will readily suggest themselves. Is any more direct and precise evidence available on the subject and can it be shown that the temperature of the body surface in the absence of brood-patches is actually below that necessary for the hatching of eggs? Is there any rise in the actual body temperature of incubating birds? And so on.

It may be said at once that the idea, which appears to be quite widespread amongst poultry keepers, that the temperature of a hen when incubating is actually higher than at other times has been shown to be without foundation. Simpson (1911) found that the rectal temperature of a hen throughout the period of incubation showed little change and was actually a trifle lower by day than that of a non-incubating bird used as a control, though slightly higher by night. Baldwin and Kendeigh (1932) similarly found no rise in temperature in wild birds during incubation.

Baldwin and Kendeigh's monograph on "The physiology of temperature in birds" is the authoritative source of detailed information on this subject and provides an invaluable body of exact data for wild birds. These authors worked especially on the Eastern House-Wren (*Troglodytes a. aedon*) of the United States, but checked many of their principal findings on several other species. The temperature of a bird fluctuates within much wider limits than that of Man and the higher mammals. With small active passerines variations of as much as 5.6°C (10°F) are not unusual in the same individual at different hours of the day, the most important single factor causing variation being muscular activity. But the standard temperature, that is the temperature at complete rest and long enough after the last meal to escape the stimulating effect of food, is much more constant. In the House-Wren it is 40.2°C in the male and 40.6°C in the female.

The skin temperatures of small passerines are always lower than the body temperatures and vary on different parts of the body. The authors found that the temperature of the female's breast is 1°C warmer than the male's, though the temperatures at the sides of the body are the same in the two sexes, and that of the back is actually slightly higher in the male. The figures were obtained on breeding birds and the difference as regards the breast is evidently mainly due to the brood-patches. It is shown that in a female before the brood-patch feathers were lost the temperature on the outer surface of the feathers was 36.1°C , partly under the feathers 38.4°C and next the skin 42.1°C . On this basis the authors observe

that by shedding the belly feathers the bird is enabled to apply a temperature to the eggs 5.6°C higher than it would otherwise have been able to do.* Excellent as this study is it is not quite clear on the subject of brood-patches. There must always be a ventral featherless apterion and the statement that "in the female the feathers are lost from both the belly and the breast during the breeding season" presumably means that the House-Wren is one of those types where the brood-patch encroaches on the feather tracts by the shedding of feathers from parts of these. But the temperature difference under discussion is not one between a completely feathered and featherless underside, but between one with a featherless area of normal skin and a more extensive bare area whose output of heat is enhanced by the increased vascularization already described. This last feature the authors do not expressly take into account, except rather vaguely by saying that the higher breast temperature in the female "would seem to indicate that the circulation of blood must be better and richer in the female in the breeding season than in the male."

The temperature under incubating birds was determined by means of a thread thermocouple stretched across the nest slightly above the eggs, so that the sensitive junction came halfway across the nest, the wire being sufficiently loose and flexible not to interfere with the bird when it settled on the eggs. In twelve individuals of eight passerine species the average highest body temperature while on the nest was 42.3°C and the lowest 41.4°C . Minor fluctuations during each spell on the nest and a daily temperature rhythm are also described, but need not detain us here. The actual internal temperatures of Eastern House-Wren eggs in the nest were found to fluctuate between average limits of 37.0°C and 34.0°C , the higher temperature occurring when the adult is incubating. It may be noted that a lower temperature is evidently required during the early part of incubation in order to initiate development than is desirable to maintain the development through the later stages. "In natural nests of the House-Wren the first eggs laid receive only a little incubation during the early days, but as succeeding eggs are laid, more and more heat is applied to them daily until the last egg is laid, when normal incubation begins in earnest. The first eggs laid receive a gradual increase in heat daily to initiate their development, but the last egg apparently starts its development at the highest degree." In an incubator the best success in hatching was obtained by starting the development of the embryo at 35°C , then after a day raising it to 36.1°C and finally to 37.8°C for most of the period.

The study of the internal temperatures of eggs during incubation was carried further by Huggins (1941). The method is to bore a hole in the egg, insert a thermocouple, sealing the hole with collodion, which also holds the thermocouple in place, and carry the thermocouple wires through the bottom of the nest to the recording

*The temperatures in this paper are given in Fahrenheit degrees with the approximate Centigrade equivalents in brackets, but only the latter are quoted here.

instruments in a hide. Huggins studied 37 species of birds of 11 orders. His figures show an average egg temperature for all orders of 34.0°C , the average for the time when the bird is sitting being 34.3°C and when the bird is off ("inattentive period") 33.4°C . The corresponding figures for passerines are 33.8° , 34.2° and 33.44°C . This is rather lower than Baldwin and Kendeigh's figures, but "in their records the egg was always in the middle of the nest, so that the maximum temperature would be obtained." Huggins's results agree with theirs when the egg was kept fixed in the centre of the nest, but often the wires were left loose enough to permit the eggs to be moved about by the bird in the natural way, so that the figures obtained may be considered to give a more exact approximation to natural conditions.

Both these papers include much other valuable data which cannot be referred to here, but reference may be made in passing to the comparatively low temperatures to which it is shown that eggs can be exposed without killing the embryos. Embryos of all stages will survive an exposure to temperatures of 15.6° — 21.1°C for as much as 16 hours, though there is some retardation of development and some embryos exposed to low temperatures die later, showing that there has been a lowering of vitality and resistance.

In round figures, then, the internal temperature of eggs in the process of incubation is 34°C , and this is induced in the House-Wren, as we have seen, by a skin temperature of not less than 42°C . This means that there is a considerable loss of heat and that to obtain a given egg temperature a very decidedly higher temperature at the body surface is needed, of the order, apparently, of some 8.0°C in the case in question. It may be recalled that the temperature at the surface of the plumage was found to be 36.1°C and even partly under the feathers only 38.4°C . These temperatures probably do not allow sufficient margin for successful incubation. It must be repeated that the male, like the female, has a ventral featherless area, which in passerines is practically devoid of down, so that some contact of the eggs with the warm skin, even though not with a brood-patch, should be possible, but it may be doubted whether males sitting casually on eggs have the impulse to lower and fluff out the breast feathers to bring the eggs into contact with the body in the manner so familiar to anyone who has carefully watched a genuinely incubating bird settling on eggs or even seen this in photographs or films.

This brings us to the changes in behaviour associated with incubation and the physiological control of these and the bodily changes already referred to. Amongst the special modes of behaviour connected with incubation are the one mentioned in the last paragraph and that of turning the eggs at intervals, which is essential to their development. It has been shown by Riddle *et al.* (1935) that "broodiness" in hens—the urge to sit on eggs—is induced by the hormone prolactin secreted by the pituitary, and there is every reason to suppose that the other behaviour changes are under

hormonic control also. The subject is a highly complex one and the situation is perhaps not quite so simple as suggested by what has just been said (for example it has been shown that a Turkey cock tied down on eggs *becomes* broody like a hen), but it is at least highly doubtful whether a male bird which exceptionally broods his mate's eggs would have the complete behaviour mechanism necessary for effective incubation. It has been shown further that the evidence is strong, though falling short of absolute proof, that such males are probably incapable of providing the eggs with sufficient warmth for their development, and so the view that casual covering of eggs by males which do not normally incubate cannot in fact be properly regarded as incubation would seem to be well-founded. Whether casual brooding by females before steady incubation starts differs in any fundamental way from the latter except in being less sustained is perhaps less clear, for the brood-patches are then already developed. This is not such an important point, but is not without interest and some questions occur in connection with it which would be worth settling. Does a female bird brooding before steady sitting commences lower her breast feathers in the way referred to above? Are the eggs appreciably warm when she leaves them? Field observation, with the requisite opportunities, should be able to settle these points.

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A TYPE OF INSIGHT LEARNING IN BIRDS

BY

W. H. THORPE, Sc.D.

PROBABLY many of those who have bird tables in their gardens will at one time or another have observed tits and perhaps other birds pull up food which is suspended by a thread ; the pulled-in loop being held by the foot while the bird reaches with its beak for the next pull. But the interest to the comparative psychologist of such a performance, as constituting perhaps the very simplest type of tool using, may not be generally realised, and consequently observations are apt to go unrecorded.

Recently (March 7th, 1943) in my garden at Cambridge I watched a Great Tit (*Parus major*) obtaining in this way a piece of cheese rind suspended by a cotton thread some 4 inches long and I was greatly impressed by the smooth ease and certainty, and the entire absence of fumbling, with which the complete act was accomplished in a matter of a few seconds. In other words the act had every appearance of "insight learning" in the sense used by W. Köhler in his classic work *The Mentality of Apes*, a real solution of a problem, distinguishing means and ends, based on apprehension of the essential relations in a situation and not upon the slow method of "Trial and Error" which consists of profiting by accidental "discovery," and in gradually eliminating useless or unsuccessful actions.

Admittedly anecdote has been the bane of comparative psychology and observations of this kind cannot tell us very much since we do not know the previous experience of the individual bird nor have we seen the first steps. Nevertheless any observations of this type of behaviour shown by wild birds are well worth putting on record. In particular, it is worth having all available evidence as to the first steps in the learning process, whether the problem is within the powers of the average member of the species or only of exceptionally gifted individuals, whether the behaviour is manifested especially by birds of a particular age or sex, etc. Perhaps readers of *British Birds* will be able to provide some additional observations.

Obviously one cannot here go into the full question of insight in birds, but it may be of interest to summarise briefly the chief records of this particular ability to secure an object by pulling a string, and to discuss their significance. From time immemorial it has been the custom in western Europe to keep Goldfinches (*Carduelis carduelis*) in cages so designed that the bird can only subsist by pulling up and holding tight two strings, that on one side of the cage being attached to a little cart containing food and resting on an incline, that on the other to a thimble containing water. This performance of the Goldfinch is mentioned by William Turner (1515-1568) and was known to Gesner and Aldrovandi in the same century. John Ray (Willughby's *Ornithologia*) mentions it and adds:—"The same does also the Millet-Bird, which our countrymen call a Linnet."

The accomplishment is mentioned by a great many authors since and was so universal that it gave rise to the local names "Putter" in Holland and "Draw Water" in England (Newton *Dictionary of Birds*, p. 166, 1896). Yet in spite of this abundance of records, there was apparently, prior to the experiments of Bierens de Haan in 1933 ("Der Stieglitz als Schöpfer," *J. f. Orn.*, Vol. LXXXI, pp. 1-22), no clear evidence how the birds learned, or were taught, to perform this trick. Bierens de Haan found that of three untrained Goldfinches one accomplished the task very quickly, apparently as a result of a primary insight into the essentials of the problem, at least as far as pulling in the string was concerned and perhaps also in relation to the holding of the loop. A second Goldfinch similarly showed insight into the pulling up part of the action but apparently only accomplished the latter part by a "Trial and Error" procedure resulting from an accidental treading on the loop. A third Goldfinch failed entirely to solve the problem. Of the other species tested by Bierens de Haan none proved so accomplished as the Goldfinches. One Chaffinch (*Fringilla cœlebs*) and two Siskins (*Carduelis spinus*) failed entirely. A Greenfinch (*Chloris chloris*) and a cock Linnet (*Carduelis cannabina*) pecked repeatedly at the string, but got no farther. Another Greenfinch and a Chaffinch evinced some understanding of the connexion between string and food by vigorous jerks and tugs, but failed to pull the cart up; while one hen Linnet executed the pull up, but was unable by any method to learn to hold it at its highest point.

W. Fischel in 1936 ("Die Gedächtnisleistungen der Vögel", *Zeit. f. Tierzücht. u. Züchtungsbiol.*, Vol. xxxvi, pp. 13-38) in contrast to the above author, recorded a successful solution of a similar problem by Siskins and also, as might have been expected, by the Budgerigar (*Melopsittacus undulatus*) and the Parrots *Ara ararauna* and *Chrysotis amazonica*. A Jay (*Garrulus glandarius*) failed in the problem. Previous to those observations, Dr. Mathilde Hertz in 1926 ("Beobachtungen an gefangenen Rabenvögeln," *Psychol. Forsch.*, Vol. viii, pp. 336-397) had recorded a similar performance by a captive Carrion-Crow (*Corvus corone*) and a captive Jackdaw (*Corvus monedula*); and Teyrovsky 1930 (*Pub. Faculty Sci. Univ. Masaryk*, Vol. cxxii) by a tame Garden-Warbler (*Sylvia borin*).*

Among wild birds at feeding tables, besides the case of the Great Tit mentioned above, the photographs by Mr. C. H. Stableford in the *Field* (January 30th, 1943, p. 117) provide evidence both for this species and for the Blue Tit (*Parus cæruleus*) and Bierens de Haan (*loc. cit.*) mentions the Coal-Tit (*Parus ater*). One would think there must be other examples from among the many species that from time to time visit food tables.†

There remains the question: what does this type of behaviour involve? The great individual variation in ability shown by Bierens de Haan's Goldfinches and the improbability of the action being in any way appropriate to the life of the bird under natural conditions forced that author to the conclusion that such behaviour cannot be

regarded as instinctive in the sense of being an inborn automatism. He therefore regards it as individual learning involving, at least in part, genuine insight.

This view has been criticised by A. Erhardt (*Zeit. f. Psychol.*, 1933, Vol. cxxx, pp. 393-98) and J. Thienemann (*Orn. Monatsb.*, 1933, Vol. xli, pp. 92-3) on the ground that "pulling up" with foot and bill is an instinctive behaviour pattern characteristic of feeding of Goldfinch, Siskin, Redpolls and Tits, but not of Greenfinch and Linnet which are ground feeders. The latter author records that "Birkenzeisige" (presumably Redpolls, *Carduelis flammea* subsp.?) occasionally deal with alder catkins in exactly this manner and presumes that it would be appropriate to a variety of flexible catkins and to fruits which are attached by long flexible stalks. Such an argument appears less convincing when applied to the cases of Garden-Warbler, Carrion-Crow and Jackdaw. Even though the last two birds do devour nuts and acorns it seems most improbable that they ever encounter in nature a stalk long enough to necessitate any such specialised technique. On the other hand one might have expected the Chaffinch to be more successful. Thus, for the present the view of Bierens de Haan seems far more likely. But the question is by no means finally settled and clearly more information is needed. As Miss Hertz (*loc. cit.* 1937) points out, possibly a *sine qua non* for the successful solution of such a problem by a bird is the possession of a general tendency to use the feet in feeding. First, therefore, it is important to know what species do have this tendency. But clearly this would only provide the basis, the raw material as it were, for the complete act. Further careful observation on as many species as possible both in the field and at bird tables is required and the aviary and laboratory experiments need repeating and extending under carefully controlled conditions, with larger numbers and with individuals of fully known history. Not until this has been done will a final answer be possible.

* Miss Hertz (*J. de Psych. norm et path.*, Vol. xxxiv, 1937) records similar behaviour for the "Serin." This article was originally written in German and was subsequently translated into French and Miss Hertz tells me that the bird referred to was the "Zeisig" (*Carduelis spinus*) and not the "Girnitz" (*Serinus canarius serinus*). The record therefore does not apply to the Serin, but merely confirms previous observation on the Siskin.

† I am indebted to Mr. W. B. Alexander for having enabled me to trace a record for the Rook (*Corvus f. frugilegus*) in J. G. Sowerby's "Rooks and their Ways," 1899.

CENSUS OF SWALLOWS AND HOUSE-MARTINS IN THE SEDBERGH DISTRICT, N.W. YORKSHIRE

BY

M. P. WINSER AND J. M. B. KING.

TYPE OF COUNTRY.

THE two squares (C.4 & C.5.) of the ordnance survey map (Sheet 20) which were covered by the two censuses contain for the most part a valley which is grassland, parts of which are now under cultivation. The valley is no lower than 400 ft. above sea-level and the fells which jut into the squares rise to 1,500 ft. in the north and 800 ft. in the south-east. The fields end at about the 700 ft. mark and the fells, which are good for sheep grazing, are covered with grass and bracken. The rivers (Lune and Rawthey) that run through the two squares are here still in their early stages and little more than large mountain streams.

PERIOD AND OBSERVERS.

The Census of each species was taken in the last weeks of June and the first few weeks of July in both years [1938 & 1942]. In that time every farm (with one exception) and building was visited at least once, if not twice.

The exception was in 1942 when one farmer refused to allow anyone to search his farm, but a careful watch from a safe distance revealed one pair in the air above the farm and this pair was duly counted.

The following members of the Sedbergh School Ornithological Society took part in making the Census.

1938 :—T. W. I. Cleasby, R. K. Martin, E. A. Winter, N. R. Gardiner.

1942 :—J. M. B. King, H. Backhouse, M. P. Winsor.

SWALLOW (*Hirundo r. rustica*).

1938 and 1942.

General Results.

Year.	Area of land.	Breeding pairs.	Pairs per 1,000 acres.
1938	4,250 acres	73	17.2
1942	4,250 acres	64	15.0

Table of Nesting Sites.

Building.						No. of Nests in :—	
						1938	1942
Hull	...	...	...	...	...	20	5
Byre	...	...	...	...	...	13	5
Barn	...	...	...	...	...	17	30
Stick-shed	...	...	...	...	...	10	6
Cart-shed	...	...	...	...	...	4	0
Stable	...	...	...	...	...	1	1
						1938	1942
Nests in company of animals					...	17	13
Nests without animals					...	56	51

Explanatory Note.

A "hull" is almost any building other than a stable or a byre in which animals are kept. A "stick-shed" is often a substantial erection whose name is strictly descriptive of its purpose.

The town of Sedbergh was not included for two reasons :—

(A) The original idea was to take a census of a rural district and the town is not included in the area given above.

(B) Time did not allow a thorough investigation of the town, but a rough survey in 1942 failed to reveal any nests in a few buildings and there were no birds around.

It can be seen from the tables that the population has decreased slightly since 1938, but it seems doubtful if this has any great significance. The barn seems to have risen in favour as a nesting-site, while hulls and byres have fallen off. This may be due to the barn's providing a site which is less interfered with, or to the farmers having shut up their buildings more carefully.

A barn is always accessible to Swallows even when the door is shut.

HOUSE-MARTIN (*Delichon u. urbica*).

1938 and 1942.

Results.

<i>Square.</i>	<i>Year</i>	<i>Area of land.</i>	<i>Breeding Pairs.</i>	<i>Pairs per 1,000 acres.</i>
C.4	1938	2,250 acres	2	0.88
C.4	1942	2,250 acres	20	8.9
C.5	1938	2,000 acres	26	13.0
C.5	1942	2,000 acres	38	19.0
C.4 & C.5	1938	4,250 acres	28	6.5
C.4 & C.5	1942	4,250 acres	58	13.6

The results are tabulated in two parts. The area is conveniently but quite arbitrarily divided into two parts (Squares C.4 and C.5 of the ordnance survey "1 inch to the mile" map, Sheet 20).

It is at once evident that the population has doubled. Just as striking is the evening-out of distribution between the two sections which are east and west of Sedbergh. This shows that it was not lack of nesting sites which limited distribution to square C.5 in 1938. The restriction was probably due to the colony tendency.

The largest colony in 1938 was 9 nests with an average of three nests per colony. In 1942 the largest was 15, and the average four nests. In 1938 there were four cases of solitary nests, but none in 1942.

There seems to be no relationship between Swallows and House-Martins, but on individual farms Swallows are rarely found if there are more than 4 or 5 pairs of Martins.

NOTE BY MAJOR A. W. BOYD.

In comparing the Sedbergh census with the results of censuses taken in Cumberland in the Swallow Enquiry of 1935 (*vide British*

Birds Vol. xxx, pp. 98-116), it is interesting to note that the bird's density at Sedbergh falls between that at Cumdivock, Dalston, where 21 pairs per 1,000 acres were breeding and that in a large area round Ullswater where only 3.4 pairs per 1,000 acres were found. The former of these areas was in a stock-raising country and the latter is part of a less cultivated district. Although the Sedburgh census area includes some fell country, the greater part lies in a valley of pastures and arable land and evidently approximates in type more closely to the Dalston district, as, indeed, is borne out by the density figures.

The conclusion, to which we came after the censuses of 1934 and 1935, was that Swallows favour a rural area, where there are suitable buildings for their nests. From the list of nesting-sites given above, it is clear that there was no lack of suitable buildings in the Sedbergh area, and that the bird's density is much what might be expected in a district of this type and at this altitude.

The Martin census also bears out our previous conclusions: that its numbers are apt to fluctuate in an unaccountable way from year to year, whereas the Swallow is far more constant, and that the presence of suitable nesting-sites has comparatively little influence on the Martin's density.

NOTES.

NOTES FROM CUMBERLAND.

WAXWING (*Bombycilla garrulus*).—Single bird near Cumdivock on December 27th, 1939.

HEDGE-SPARROW (*Prunella m. occidentalis*).—During three weeks of frost in January 1941 as many as ten birds were noticed feeding quietly together amongst the chaff and straw in a dutch barn.

SWALLOW (*Hirundo r. rustica*).—In June 1941, a pair nested in a cow-byre. Two nests were built one foot apart on the same beam, but behind separate uprights: the birds were evidently unable to distinguish between the two nests and three eggs were laid in one nest, two eggs in the other. I removed the two eggs and placed them with the other three: all five eggs hatched out during the one day.

[For a similar case *vide, antea*, Vol. xxx, p. 322.]

MARSH-HARRIER (*Circus a. æruginosus*). An adult watched quartering a rushy field north of Bassenthwaite Lake on December 25th, 1941. In flight the long pointed wings and large square-cut tail were noticeable: the whitish head, black primaries, and chocolate-brown mantle were conspicuous.

BLACK-TAILED GODWIT (*Limosa l. limosa*).—A pair on the river Esk adjoining Rockcliffe Marsh on September 29th, 1940.

BLACK GUILLEMOT (*Uria g. grylle*).—On July 24th, 1932 an adult was observed on a ledge at St. Bees Head, whilst a pair was observed swimming in the sea about one hundred yards distant from the headland on July 21st, 1935. These observations should be noted in connection with the breeding of this species at St. Bees Head in 1940 as recorded by Messrs. J. W. Bennett and P. S. Burns (*antea*, Vol. xxxiv, p. 93).

LITTLE CRAKE (*Porzana parva*).—On November 3rd, 1940 a small Crake was disturbed from some rough grass bordering a small pool tangled over with branches and brambles in Shawkfoot Quarries, Dalston. The Crake took refuge amongst the branches only to be disturbed by a stoat whereupon it climbed to the top of the branches and sat there in full view of me, at about ten yards distance, for five minutes or longer. The following particulars regarding its plumage were noted as it sat in bright sunlight. A short green bill; upper plumage olive-brown, mantle with black stripes, throat and breast and belly bluish-slate in colour, under tail-coverts tipped with white, legs green.

R. H. BROWN.

SEXUAL BEHAVIOUR OF TREE-CREEPERS.

IN the early morning of May 7th, 1943, at Langton Green, Kent, I watched a Tree-Creeper (*Certhia f. britannica*) lying motionless against the bark of a pine tree, some 10 feet from the ground. The wings were relaxed against the body and the tail-feathers fanned.

The bird was in this position for over a minute, silent all the while. Another Tree-Creeper then appeared, creeping from around the other side of the tree, and attempted to mount the female, who uttered a thin shivering note after the unsuccessful effort. The male

then flew rapidly a short distance away, returned, and this time succeeded in mounting the female, which resulted in coition.

I have put the above on record because it would appear unusual in the Tree-Creeper to invite the male to mate, by lying perfectly still. According to *The Handbook of British Birds* and my own previous observations, coition generally takes place after a rapid spiral flight around a tree.

P. A. ADOLPH.

WILLOW-WARBLER USING FEATHERS FROM DESERTED NEST WITH CUCKOO'S EGG.

ON May 3rd, 1943, I watched a Willow-Warbler (*Phylloscopus t. trochilus*) carrying feathers to a nest she was building. I was rather puzzled, because she kept flying to the same spot about twenty feet away, each time returning with feathers for the nest she was building. Some ten minutes elapsed before it was expedient to investigate, when, to my amazement, I found she was removing feathers from her deserted nest in which were two of her own and a Cuckoo's egg. Except for one or two feathers just outside the nest, which it seemed obvious she had pulled out whilst dismantling the feathered lining, the nest was undisturbed. It's position was such that the Cuckoo would have had no difficulty in laying the egg through the entrance. On the following evening, in the company of two friends, I removed the three eggs which I have kept.

R. E. WILLIAMS.

WESTERN BLACK-EARED WHEATEAR IN LANCASHIRE.

ON April 21st, 1943, Mr. F. W. Holder saw a male Black-eared Wheatear of the black-throated form at Ainsdale on the south Lancashire coast. He came on it suddenly among the sand-dunes and watched it for some time at rest at a distance of eight yards. He noted a black wedge through the eye, the black extending over the chin, sides of throat and ear-coverts. There was no white eye-stripe. The wings were black and the bird had a pale crown and sandy-brown mantle and a buff flush on the breast. When the bird flew Mr. Holder had a perfect view of the tail and saw a distinct curve in the barring of the tail towards the central and very noticeable black tail-feathers, due to the narrowing of the black tips from the outer feathers inwards. The bird never gave him the opportunity to see its forehead, but from the extent of black on the throat he concluded that it was a Western Black-eared Wheatear (*Enanthe h. hispanica*). The brilliance of the bird's plumage impressed Mr. Holder greatly.

A. W. BOYD.

DISPLAY OF BLACK REDSTART.

ON April 28th, 1943, I was able to observe from my rooms, on the top of Clare College, Cambridge, a display of the male Black Redstart (*Phœnicurus ochrurus gibraltariensis*) which does not appear to have been recorded.

It was a warm sunny afternoon and I was attracted first by the continuous song. The male was chasing the female all round the

court, singing constantly. They seemed to delight in dodging around chimney-pots, etc. at a speed that was almost too quick to follow. Eventually the female settled and the male flew about in front of her, singing a song that was much more wheezy and grating than usual. The flight was very similar to that of the male Greenfinch's courtship flight, and the bird twisted from side to side. It was followed by some further chasing. It was later seen that the male had a broad, white wing-bar.

JEFFERY G. HARRISON.

CURIOUS FATALITY TO KESTRELS.

ON April 23rd, 1943, an observer walking across a field near Beverley (E. Yorks) saw at some little distance, two hawks apparently fighting. As he watched, the birds flew violently together and both fell to the ground dead.

On examination they proved to be a pair of Kestrels (*Falco t. tinnunculus*), adult male and female. The cock bird was a particularly beautifully marked specimen with a wing span of 24 inches, whilst that of the female was 27 inches. Further examination revealed that the hen bird contained a firm shelled, unpigmented egg.

The actual fight to the death at this time of year between a male and female of the same species seems an unusual occurrence, and I shall be glad if anyone can suggest any reasonable explanation.

JOHN L. CROOKS.

GARGANEY IN SKYE.

ON March 28th, 1943, I was able to observe with binoculars four drakes and three ducks of the Garganey (*Anas querquedula*) at rest on the inland Loch Suardal, near Dunvegan, Isle of Skye. I was able to see clearly distinctive characters such as in the males, the light eye-stripe, the sharp line where the red-brown of the breast ends suddenly, and the black bill. There was a distinct blueness noticeable about the shoulders, but during the several hours I watched them the birds rested on the water, I did not see them in flight. I believe the Garganey has not before been recorded from the Inner Hebrides and only once from the Outer Hebrides.

ROGER C. PRIDEAUX.

HERON DIVING.

MR. R. MILNES WALKER's note (*antea*, Vol. xxxvi, p. 246) on this subject induces me to put on record that about 20 years ago I several times watched a Heron (*Ardea c. cinerea*) that used to dive into the Ouse at St. Neots (Hunts).

It would perch, hunched up on an overhanging willow branch, six or eight feet above the water with bill pointed downwards watching the surface. The dive was performed by leaning forward until overbalancing took place, without any sort of spring. Very like the dive of a Kingfisher. As the body entered the water violent flapping of the wings caused great splashing and finally the Heron

rose in the air. If a fish was caught (as it frequently was) it was taken to the opposite meadow and there devoured. If unsuccessful a circuit was flown and the bird returned to its perch.

C. F. TEBBUTT.

IVORY-GULL IN DUMFRIES-SHIRE.

AN Ivory-Gull (*Pagophila eburnea*) was shot by a local wildfowler at Glencaple on March 1st, 1943 while it was feeding on a dead Lapwing. The bird proved on dissection to be a male and it was in full and perfect plumage. It came into my hands, but I have given it to Mr. Arthur Duncan.

HUGH GLADSTONE.

"SONG" OF CARRION-CROW.—The Carrion-Crow (*Corvus corone*) is known occasionally to produce a kind of uncouth attempt at song (*cf. Handbook*, Vol. i, p. 15), but as no very adequate account of this seems to have been published, the following description of a version heard in Staffordshire, sent us by Mr. J. G. Bacchus, is deserving of record.

It consisted of a series of rhythmic, double notes, not unpleasant, suggesting a rhythmic piston beat. The first portion was a soft croak, accompanied by puffing of the throat and a slight bowing of the head. The second portion was a snapping sound, made by the beak. The performance was nearly always accompanied by opening of the outer tail-feathers and, occasionally, vibration of them. These "piston-strokes" varied from 4 to 10 at a time, with 5 or 6 as a rule. They occurred at irregular intervals of about a minute and the whole performance lasted about 20 minutes. No other Crow could be seen, though one could be heard in the distance.

UNUSUAL SITE AND DATE OF GOLDFINCH'S NEST.—Mr. W. E. Glegg writes that Mr. H. C. Playne has informed him that at Minchinhampton (Gloucestershire) on April 26th, 1943, he inspected a nest of the Goldfinch (*Carduelis c. britannica*) which was built on the top of the thick stalk of a plant of brussels sprouts about 4 ft. above the ground and surrounded by the flowering shoots. The female was sitting on five eggs.

HOOPOES ON THE ISLE OF MAN AND LUNDY.—Mr. H. M. Rogers informs us that a Hoopoe (*Upupa e. epops*) was found with a broken wing near Douglas on April 23rd, 1943, and Mr. M. C. Harman writes that one was seen daily on Lundy from April 16th to 20th. The Hoopoe has very rarely been recorded from the Isle of Man and not for many years from Lundy.

EXCEPTIONAL NUMBERS OF PINTAIL AND SMEW ON FRESH WATER.—Mr. T. Bispham informs us that on March 7th, 1943, a flock of over a hundred Pintail (*Anas a. acuta*) were seen by Messrs. C. B. Ashby, J. R. Mallinson, R. H. M. Ryall and himself on a marsh by the River Blackwater, Essex, about seven miles from the sea, and that over a hundred were again present on the 28th.

Mr. G. Mannering also informs us that there were exceptional numbers of Pintail last autumn in his marsh, which is well inland, in east Kent. He considered there were three to four hundred

present. They began to arrive at the end of September, 1942 and were in greatest numbers from October 7th to 10th.

Information received by Dr. N. F. Ticehurst shows that there were certainly many more Pintail than usual on Romney Marsh in January, when flocks of fifteen to thirty were quite numerous at flight.

It may be noted that quite exceptionally large numbers were also reported in the West of Ireland in November and March by Major R. F. Rutledge (*antea*, Vol. xxxvi, p. 243).

In addition Pintail have been markedly more frequent than usual, though naturally in much smaller numbers than the above, in some areas far inland. Thus, Mr. W. E. Glegg writes that this was the case at the Tring Reservoirs, where a maximum of ten to twelve was observed in November, such a number being quite unprecedented for that locality. The same is true of the Oxford district, where a flock of a dozen was seen in January, one of about the same number at another place in March, and smaller numbers in several localities on different dates from September to February (B. W. Tucker). A number were also reported on floods at Olney, Bucks, in February, 1943, up to a maximum of fifteen or sixteen on February 11th.

Mr. Bispham also saw a flock of seventy to eighty Smew (*Mergus albellus*), of which approximately one-third were adult males, on the Brent Reservoir, Middlesex, on February 28th. In our experience such a number is very exceptional on fresh waters in this country. One hundred and seventeen Smew on Molesey Reservoir on December 28th, 1938 is, we believe the largest number recorded of that species.

GREAT SKUA IN CORNWALL.—Mr. W. R. Taylor writes that he and other observers had close views of a Great Skua (*Stercorarius skua*) on the beach at Bude on April 28th, 1943. The bird appeared exhausted and was reluctant to move for some time. On May 1st the corpse of a Great Skua, presumably the same bird, was found close to the spot.

REVIEWS.

Adventurers Fen. Written and illustrated by E. A. R. Ennion. (Methuen). 10s. 6d.

DR. ENNION'S account of the vicissitudes of the Cambridge fen he has known and loved for forty years has much to attract and interest the naturalist and country lover. At first as a fen he tells how its natural resources of turf, litter and reeds were worked, and if birds were few there were many attractive insects such as swallow-tailed butterflies and hawk moths. Then the water was controlled and agriculture came in and the fen disappeared. Crops at first were good, but costs were high, and the land gradually becoming exhausted and prices dropping the plough was less and less used. Ditches began to get choked and marsh plants re-appeared. This transition period was interesting. The birds which came were mostly visitors and, except for the Reed-Warbler, true fen country was not necessary for those that bred there. But some of the visitors, which came for food such as Montagu's Harriers and Short-eared Owls were forerunners of what was to come, and amongst them was one great rarity, a Yellowshank, no doubt the same bird which

visited Cambridge Sewage Farm from March 1934 and was last seen in September, 1935, we have always understood; but Dr Ennion gives the date as October, 1936.

In the winter of 1936-37, a great flood transformed the fen and the true fen birds soon followed and amongst them the Bittern and even a pair of Black-necked Grebes came to breed.

Now once more the fen has been drained and the tractor is at work, but let us hope that some day history will repeat itself and that the reeds will grow thick enough for the Bittern to return.

The book is embellished with many of the author's drawings, which give an added charm to this interesting little history.

The Birds of Britain. By James Fisher. Illustrated. (Collins). 4s. 6d.

In this little book, which is one of the "Britain in Pictures" series, Mr. Fisher gives an interesting general survey of Great Britain and its birds past and present with special reference to certain species. He goes on to give an idea of the work of observers and discusses especially the pioneers of the past. The plan is effective and on the whole it has been well carried out.

We notice some doubtful statements of which one or two should be pointed out. It is a great mistake, we think, to give bird population numbers as Mr. Fisher does as though they were approximately correct and had a sound foundation. He says for instance that about 120 millions of birds breed in Great Britain apart from sea-birds, but there can be only the slenderest foundation for such a statement. It is based, we assume, on censuses which have been made over comparatively very few acres of a few types of country and it is obvious that small mistakes multiplied 57 million times (the total acreage given) can become gross errors. To give approximate numbers to certain species (p. 24) is even more misleading. We have already seen these population figures quoted and used as though they were really reliable and it is a great pity that an author of Mr. Fisher's ability should make statements of this kind based on entirely inadequate data. Serious ornithologists should take the greatest care in popular writings that their statements have a sound and adequate basis of fact.

There are other points which require some amendment as for instance the wording on page 16 summarising the account of the northward spread over Europe in spring of the Swallow. This reads "This full distance they travel in about 77 days—two thousand miles—keeping almost perfect step with the temperature 48 degrees Fahrenheit." This will surely be taken by many to mean that individual Swallows keep on moving northward step by step at this rate, whereas all the evidence indicates that more northerly breeding individuals arrive later at more southerly points than the individuals which breed there, and pass over them.

At the end of the book Mr. Fisher gives lists of birds in various categories. In such lists it is always difficult to know where to place some species, but we must disagree with some of the entries here. The Scaup should not be included among breeding residents, the Black-tailed Godwit is included, but its claim is slender compared with the Black Redstart, which is placed only as a passage-migrant, while the Meadow-Pipit is classed as a summer visitor whereas it should be amongst resident species. Scarce visitors and vagrants are split into three lists, but they grade into each other and several of those in the main list have been recorded less than twelve times and should figure in the next list, while a bird like the Great Grey Shrike should be among the winter visitors. In the last list confined to birds which have been recorded only once Woodchat Shrike is evidently a slip for Masked Shrike and Ross's Gull now has a second record to its credit.

The illustrations are very nicely reproduced and are chosen from the work of a number of bird-artists during the last 150 years or so. Some artists are represented by a number of examples and Audubon, an American, by two. The series as selected is very interesting, but a wider choice of artists would have made it more so.

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AN EXAMINATION OF INCUBATION IN ITS WIDER ASPECTS BASED ON OBSERVATION IN NORTH CORNWALL

BY

LT.-COLONEL B. H. RYVES.

It is my purpose here to examine the subject of incubation on a wider scale than in my first paper (*antea*, pp. 10-16).

The present article must be regarded as a second chapter—or indeed a concluding chapter to the first.

There I tried to draw the distinction between incubation and brooding. I might then have emphasized that the point was not a new one, for I drew attention to it, nine years ago, in my papers on Corn-Buntings (*antea*, Vol. xxviii, pp. 2-26 and pp. 154-164). But it seems that it is a point which has been and is being overlooked. I further described the reactions and rôles of male birds only in their relation to incubation.

I now propose to discuss the behaviour, during incubation, of female birds of Category 1 (species in which the females undertake incubation and males may occasionally brood the eggs) and of both females and males of Category 2 (species in which the males undertake a definite and proved part in incubation throughout the period).

Before embarking on such discussion, I have some observations to make which are of a general character and which have a definite bearing on incubation. They concern the laying of eggs which follows the completion of the first nest and of laying of further eggs consequent on either disaster to first clutches or after the successful rearing of a brood.

No definite rules can be laid down on these points and there are considerable variations among the different species. But the following notes will throw some light on the extent to which birds in such circumstances may be capable—or it may be incapable—of egg-laying and of subsequent incubation. Such capacity appears to vary to a marked degree. I suggest, as I certainly believe myself, that, although a bird's ovary may contain a large number of potential eggs, they can only develop to maturity when the bird acquires the physiological changes necessary for the performance of incubation. There is, at least, a definite limit to the number of clutches any individual bird can produce.

I will try to explain some of these points under specific headings:—

Retardation of Egg-laying.

With some species, notably resident and early-nesting ones, there is a very noticeable delay in the laying of an early clutch (though of course there are exceptions) after nest-building has begun. I can only guess at the causes. Possibly adverse weather may have a retarding effect on the development of the eggs. Or

it may be the problem of territory that induces some birds to build their nests long in advance of laying. The nest may stake out a claim to an individual territory. Or possibly the explanation lies in a combination of these two factors.

[NOTE.—A territory which has apparently been established by a male before breeding has begun, through a song-perch, is not in my experience, necessarily a permanent one. The female may prefer another site and cause the male to transfer to the territory of her choice. As the breeding-season advances, territory seems to assume a lesser significance. Further, when breeding is in full swing, the earlier aggressiveness towards neighbours largely disappears owing to the concentration of the pair's attention and energies on the immediate task in hand].

The following are a few examples of many I could quote:—

1. TREE-CREEPER (*Certhia familiaris britannica*). On April 3rd, nest-building began, but the first egg was not laid until May 7th.

2. SONG-THRUSH (*Turdus e. ericetorum*). On February 14th, a nest was completed. First egg was laid on March 14th.

3. SONG-THRUSH. On February 22nd, the foundation of a nest was built. Nothing more was done until March 11th when the nest was completed except for the mud lining which was added on the 14th. The first egg was laid on the 18th.

4. ROBIN (*Erithacus rubecula melophilus*). On March 6th, the nest was completed. The first egg was laid on April 7th.

[NOTE.—At no nest built when the breeding season is well established have I recorded anything like such long delays in laying as the above].

Rapidity of Egg-laying.

In marked contrast to the above cases, the following are examples of rapid laying (I could give a few more of a similar nature):—

1. WHITETHROAT (*Sylvia c. communis*). On June 5th, young about a week old were killed by a rat. On the same day, the male began building a new nest. On the 9th, the first egg of a clutch of five was laid [The eggs were hatched on the 24th (11 days) and the young left the nest on July 5th (11 days)].

2. MISTLE-THRUSH (*Turdus v. viscivorus*). On April 30th, a first nest held chicks which flew the next day. The female parent, early in the day, left the nestlings to the entire care of the male and began constructing a new nest a few yards away. She worked extremely hard the whole day with scarcely any respite and, by sunset, had completed it—a really amazing performance. On May 1st, the first egg of a clutch of four was laid, a brood being safely reared. The young of the first nest kept in close touch with the second throughout.

3. BLACKBIRD (*Turdus m. merula*). On May 16th, eggs were hatched, but the chicks all died within a few hours. On May 17th, the building of a new nest was begun and, on the 22nd, a clutch of three eggs was completed.

Normal laying of successive clutches.

As an introduction to the long list of examples given under this heading, I would stress the point that, in my experience, many birds are not capable of producing clutches of eggs following disaster to the first nesting with the ease that seems to be generally believed (but, certainly, some individual birds are more prolific than the majority of their kind). With double-brooded species disaster to the first nest often results in only one brood being reared. If eggs are destroyed when incubation is far advanced, either a long period elapses before a second clutch is laid or the bird is unable to lay again at all. This, I think, notably applies to some of the larger birds, for instance harriers and other hawks. But if eggs are destroyed when quite fresh, a second clutch may be laid fairly soon.

With these preliminary remarks, we may proceed with the list of examples:—

1. MISTLE-THRUSH. On April 14th, well developed and strong young (15 days old) left the first nest. The first egg of the second clutch was laid in the same nest on May 3rd.

2. MISTLE-THRUSH. On April 20th, the first nest holding young about a week old was blown down by a storm. The first egg of a second clutch was laid in a new nest on May 1st and a brood was reared. There was no further laying and thus only one brood was produced.

3. SONG-THRUSH. *First nest*—Young fledged on April 24th. *Second nest*—First egg laid on April 29th and young fledged on May 29th. *Third nest*—First egg laid on June 5th and young fledged on July 5th.

[NOTE.—These layings were certainly more rapid than in any other of my records. In my experience in North Cornwall, the rearing of three broods is far from general. Two broods are fairly common and single broods are not exceptional].

4. BLACKBIRD. *First nest*—Young fledged on April 14th. *Second nest*—First egg laid on April 22nd and young fledged on May 20th. *Third nest*—First egg laid on June 13th and young fledged on July 13th.

[NOTE.—My remarks (last two sentences) under Song-Thrush above apply here also. I have never recorded an attempt to rear a fourth brood].

5. BLACKBIRD. For further records of treble-brooding and dates of laying, see my notes in Vol. xxii, pp. 87-88.

6. ROBIN. *First nest*—Young fledged on May 25th. *Second nest*—First egg laid on June 14th.

7. ROBIN. *First nest*—Young fledged on April 28th. *Second nest*—First egg laid on May 19th.

8. ROBIN. *First nest*—Young died when six days old on May 2nd. *Second nest*—First egg laid on May 16th. The clutch of four eggs destroyed by a mouse on May 20th. *Third nest*—First egg laid on May 29th.

[NOTE.—Notice the quicker laying of the third clutch of the last Robin. I have no record yet of a Robin attempting to rear a third brood].

9. BRITISH DIPPER (*Cinclus c. gularis*). *First nest* (repaired from the previous year)—Young fledged on May 6th. *Second nest* (the first nest again repaired)—First egg laid on May 15th.

[NOTE.—The incubation period has been 16 days in each of twelve recorded nests. I have closely observed four breeding pairs for several years, but never secured a record of any pair attempting a third brood].

10. WOOD-PIGEON (*Columba p. palumbus*). The rearing of *three broods* by one pair in a season is definitely uncommon in North Cornwall. From some fifty pairs observed over a period of years, I have secured only three records of it. The layings of one of them were as follows :—*First nest*—Young fledged on June 2nd. *Second nest*—First egg laid on June 19th. Young fledged on July 31st. *Third nest*—First egg laid on August 29th.

The rearing of two broods has been common. From many records obtained, the period between the fledging of the first brood and the laying of the first egg of the second clutch has varied around 44 to 49 days.

A small percentage of the birds observed have been single-brooded and have nested mainly in August and September. It seems possible that such birds might be ones bred late in the previous season.

We may now proceed with an examination of the behaviour of birds during the period following the laying of the first egg up to the time of hatching :—

FEMALES OF CATEGORY I.

Some species commence steady *incubation* with the laying of the first egg, others with the laying of the last egg and yet others with an egg or two prior to the last one.* Further, there are instances of individual females postponing incubation even after the clutch has been completed. Many birds brood their eggs both during the period of laying and after the full set has been laid.

I shall not attempt to compile lists of birds according to the different behaviours alluded to above, as behaviour is too flexible for any generalisation.

In connection with the above remarks, there are three points which I think should be examined separately, namely (1) *Brooding of Eggs*, (2) *Postponement of Incubation* and (3) *The feeding of incubating females* :—

(1) *Brooding of Eggs.*

I believe that one of the explanations of considerable variability

*The result of this latter method of incubation is that the nest often holds one or two chicks younger than the rest. In consequence they may sometimes become casualties.

in recorded cases of the incubation period is to be found in our failure in the past to appreciate the difference between brooding and incubation. It follows, therefore, that recorded errors in many instances can be corrected by intensive observation.

As brooding is so general among many species, I will give only a few records which show how easily incorrect incubation periods could be reported :—

1. GOLDFINCH (*Carduelis c. britannica*). *First egg* laid on May 26th. The female brooded irregularly throughout the day, once for a period of over an hour. One absence of 45 minutes (too long for incubation) was recorded. *Second egg* laid on the 27th; behaviour similar. *Third egg* laid on the 28th; behaviour as before with the striking difference that the female remained on her eggs for the night (with the first two eggs she left her nest about an hour before sunset and did not return for the night). *Fourth egg* was laid on the 29th; it became evident that incubation had begun, although the fifth and last egg was laid on the 30th. The behaviour of both birds had quite changed. The female sat for the usual regular shifts of about an hour and her absences from the nest did not exceed about 20 minutes. The male paid periodical visits, sometimes feeding his mate on the nest or calling her off to accompany her to feed. For the first three days the male stayed near the nest and indulged in much song and excited twitterings. He made no attempt to feed her, but merely flew around in wide circles, alighting for short spells on various perches. The impression he gave was that he was impatiently waiting for the female to quit the nest and to accompany him to some feeding ground, but all his efforts to call her off were ignored. During proper incubation the female responds almost instantly to the male's invitation. I think it is quite clear in this case that incubation was commenced with the laying of the last egg but one. The sitting on the night previous may have amounted to no more than brooding or steady incubation may actually have begun. Absolute precision on such a point is at present scarcely possible, but see (3) ROBIN and GREAT TIT below.

2. CORN-BUNTING (*Emberiza calandra*). Brooding by this species has already been described in the articles I have referred to.

3. ROBIN. The fifth and last egg was laid on April 11th, and the female brooded most of the day. On the 12th and 13th, I never saw her on the nest. On the 14th and 15th, she brooded for most of the day. On the 16th, 17th and 18th, she was absent altogether during the day but returned to her eggs for the night. On the 19th, I reckoned incubation was at last in process. On May 2nd, the full clutch was hatched—21 days after the last egg had been laid, but, since incubation only began 8 days later, the incubation period was 13 days.

(2) *Postponement of Incubation.*

This is another possible source of error in recording an incubation period.

1. GREAT TIT (*Parus major newtoni*). A clutch of six eggs was completed on April 22nd, but on that day and the four following days the female only covered the eggs during the night. On the 27th, incubation was begun. Chicks were hatched on May 11th—19 days after the last egg was laid. But the incubation period was 14 days.

2. ROBIN. The clutch was completed on April 3rd, but the female did not sit on her eggs, nor did she do so on the 4th. On the 5th, she began incubation and hatched her eggs on the 18th—15 days after the last egg was laid but the incubation period was 13 days.

3. ROBIN. A case of erratic behaviour to which this species seems prone. The clutch was completed on April 11th, but the bird did not sit. On the 12th, she sat erratically, quitting her eggs at frequent intervals and on two occasions, being absent for over an hour. On the 13th and 14th, she appeared to be incubating quite normally. On the 15th, she again sat erratically, but there were no long absences from the eggs. On the 16th, I recorded an absence of $2\frac{1}{2}$ hours (4 to 6.30 p.m.) and I wondered if the nest had been deserted. It was a warm afternoon. On the 26th, all the eggs hatched out—15 days after the last egg was laid. In this case, I reckon incubation was begun on the 13th, thus making the incubation period 13 days. The absence of $2\frac{1}{2}$ hours is certainly abnormal. That no injury was caused to the eggs is proved by the subsequent hatching and rearing of the brood. On this point, Mr. B. W. Tucker's valuable paper in the July issue is illuminating.

(3) *The feeding of Incubating females.*

During incubation, food is procured in three different ways:—*First*—food is entirely provided by the male with certain species (rare exceptions excluded), such as Raven, Rook, Magpie, Chough, Greenfinch* and Montagu's Harrier and probably others. *Second*—Food is partially provided by the male and partially secured by the female herself with such species as Goldfinch, Bullfinch, Chaffinch (male more or less rarely feeds female), Cirl Bunting, Tree-Creeper, Great Tit, Blue Tit, Coal-Tit, Spotted Flycatcher and Robin, and no doubt many others. *Third*—Food is entirely secured by the female herself (rare exceptions excluded) with such species as Corn-Bunting, House-Sparrow, Wood-Lark, Sky-Lark, Meadow-Pipit, Rock-Pipit, Nuthatch, Long-tailed Tit, Goldcrest, Chiffchaff, Willow-Warbler, Wood-Warbler, Mistle-Thrush, Song-Thrush, Blackbird, Stonechat, Hedge-Sparrow, Wren and Dipper and, no doubt, others.

The above lists are, of course, very incomplete. They are meant merely to serve as a nucleus to much more detailed investigations.

As regards those species in which the males feed their mates, the latter are either fed on the nest or called off for the purpose.

*I have found some males are sometimes inattentive and in such cases the female gets some food for herself.

Normally, if not disturbed, absences from the eggs are short—I would say up to 15 minutes.

Species in which the female feeds herself or is partially fed by the male may be grouped together in regard to the duration of sitting shifts and of absences to feed. Both periods are longer with some species than with others, notably perhaps with Wood-Lark, and shorter with Chaffinch. Broadly speaking, however, most birds seem to sit for an hour or so and are absent to feed for anything between a few minutes to rather over half-an-hour. But there are variations, of course, governed by the climatic or other conditions prevailing. So far as I have observed, the length of these periods are not influenced by the size of the bird.

FEMALES AND MALES OF CATEGORY 2.

The main differences in behaviour are to be found, I think, in two points:—(a) Each bird feeds itself entirely or almost so. (b) Reliefs are rapidly effected, eggs being uncovered for only short periods.

In view of these factors, it is difficult, if not impossible, to distinguish brooding from incubation.

But, from records in *The Handbook*, the above points do not apply to all of the many species in this Category—notably certain sea-birds so intensively observed by Mr. R. M. Lockley.

OTHER POINTS REGARDING INCUBATION.

There are species of both Category 1 and Category 2 in which incubation is commenced with the first egg, subsequent eggs being laid at intervals of more than one day. With two observed species in this class, I have found that the first eggs have taken longer to hatch than those laid later.

The late Rev. F. C. R. Jourdain draws attention to this point in *The Handbook* (Vol. i, p. xxi). But the point has not been clearly elucidated and certainly calls for investigation and research. It is, at least, a point of extreme interest.

Bearing on the above, the following are the only three records I have secured:—

BUZZARD (*Buteo b. buteo*) No. 1 (Category 2):—

First egg laid April 5th. Hatched May 13th. Period 38 days.
Second egg „ April 8th. „ May 14th. „ 36 „

BUZZARD No. 2.:—

First egg laid April 9th. Hatched May 16th. Period 37 days.
Second egg „ April 12th. „ May 18th. „ 36 „
Third egg „ April 15th. „ May 19th. „ 34 „

It seems possible that one or both birds may only have brooded in the early stages, but more interrupted and erratic incubation at this time would also retard development.

MONTAGU'S HARRIER (*Circus pygargus*). (Category 1).

The *Handbook* states that the incubation period for each egg is 28-29 days and that eggs are laid at intervals of 2-3 days.

The following are the details of a nest intensively observed :—

The *first egg* was laid on May 14th. The clutch consisted of four eggs, but the dates of the subsequent layings were not recorded.

Hatching. On the evening of June 13th, there were still four eggs. During the 14th, two eggs were hatched and, in the evening, the third egg was chipped and hatched out the following morning. The incubation period for the first egg was thus 31 days. If the second and third eggs had been laid at normal intervals, the period of hatching was considerably less than 31 days. Even if they had been laid at only one day's interval, their hatching "overtook" the hatching of the first egg.

My remarks under the Buzzards above seem to have some application here also.

Finally, I desire to express my grateful thanks to Mr. B. W. Tucker for the valuable help and advice he has given me in connection with both my papers. His profound biological knowledge has cleared up for me some puzzling points in a subject of great complexity and difficulty—a subject in which, as he himself says, there are some considerable gaps in our present knowledge.

VARIATIONS IN CHAFFINCH SONG

BY

A. D. G. SMART.

WORKING at first with four birds (A, B, C and D) I made the following observations on the songs of Chaffinches (*Fringilla c. gentleri*) in a coastal area of south Devon during the spring of 1942. B and C held adjacent territories and their songs were inter-audible, but A's territory was separated from these by a river and marsh and D's from A's by a small town ; so there was no chance of imitation of one bird by another except in the case of B and C. Later on I shall analyse some observations concerning B's and C's songs, and the songs of three birds that held adjacent territories further up the valley.

THE SONG.

Tone and Volume.—In the area studied it was found that tone changes locally, by valleys ; all the birds in any one valley sing with the same tone. I have however, one unique record of D changing his tone spontaneously for three songs, the change being preceded by "soft" singing (sub-song—see below) and followed by soft sparrow-like chirps. Although I have heard soft songs followed by loud in many birds, including D, without this change to wheezy tone, I cannot help thinking that the soft singing had some bearing on it. There are two volume strengths : loud, as used in the normal song and soft, as used in the subsong. I have heard volume decrease song by song from loud to soft, but never vice-versa ; after soft singing the bird has to revert straight away to full volume strength.

The general form of song (see fig. 1).—There are two main forms of song as used by all the birds, and two subsidiary forms ; individual birds have their own variations of these songs.



FIG. 1.

Fig. 1 shows these four types, using Rowan's method of notation (1924). A \cup represents an unaccented note, and a $-$ represents an accented note. Pitch is indicated by the level on which the notes are written, and the length of the note by the length of the mark: \cup or \smile ; $-$ or $-$. Continuity is expressed by the thin bowed line below the marks, and a curved line above the marks denotes a slur. I have used two additional symbols, a wavy line to denote notes repeated fast enough to form a trill, and a circumflex accent above notes to denote particular stress. It can be seen that all four songs have in common the terminal flourish (the "British Museum" notes referred to by D. S. Falconer, *Brit. B.*, Vol. xxxv, p. 98).

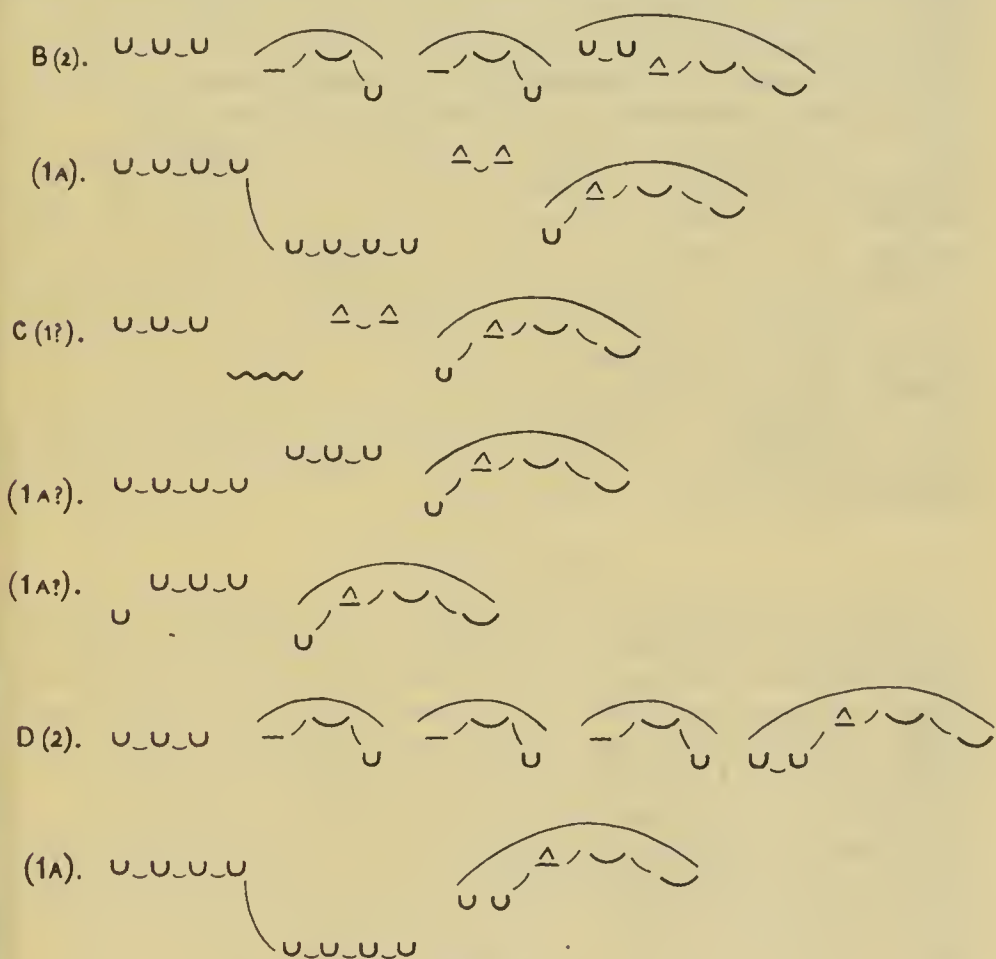


FIG. 2.

Also the first four (or occasionally three) notes of songs 1, 1A and 2A are the same, but are pitched a little lower in 2. The differences between 1 and 2 are obvious, and so are those between 1A and 2A. But I feel that the difference between 1 and 1A and 2 and 2A need explaining. Songs 1 and 1A are the same in tune, but different in accentuation. The latter has no real accented climax till the "terminal flourish," whereas the former has two real stresses, the first on the trill and the second on the flourish. Again, in 1A the

first eight notes are all continuous, the only change being the drop in pitch after the first four, whereas in 1 the corresponding notes (the first four and the trill) have a distinct break in sequence, as well as a drop in pitch. These first eight notes in 1A accelerate into the song, and the "terminal flourish" is slower than in 1. Song 2A seems to be a mixture of 1A and 2; I have only heard it from A and D, but it is used by birds in the surrounding villages.

These four forms of songs are sung in groups, and I refer the reader to an article on page 159 of Vol. xxxiv by M. Brooks-King for further information about grouping.

Individual Variation from the above songs.—I shall deal with each bird in turn describing the variations; where variations need writing down as well as describing, they will be found in fig. 2.

A: 1, normal. 2, normal with occasional doubling of introductory note of final flourish. 1A, never heard. 2A, normal.

B: 1, never heard (since C sings 1, this is probably due to insufficient watching). 2, normal, as well as a variation with high-pitched introductory notes to song and to "terminal flourish" (see fig. 2). 1A, normal, as well as a variation with two highly accented notes before terminal flourish (see fig. 2). 2A, never heard.

C: 1, normal. 2, normal. 1A, stereotyped version never heard; he only sings B's variation. 2A, never heard. I have recorded three "freaks" from this bird (see fig. 2).

D: 1, normal. 2, normal, as well as two variations with extra centre-part (see fig. 2) 1A normal, once without the two notes before the flourish (see fig. 2). 2A, normal.

THE SUBSONG.

There was no stereotyped subsong. D. S. Falconer (Vol. xxxv, p. 98) writes that it consists normally of "a variety of gentle chirps uttered without opening the beak, but often very quiet renderings of the real song were heard, as if from a bird much further away. While giving the subsong the bird was invariably quiet and very inconspicuous." I feel that this is a more suitable description than I could give, but he makes no mention of a low gurgling rattle given by the male during these chirps and "soft" songs. During sexual chases I have frequently noted the male uttering this gurgle followed by a very quick and soft "terminal flourish" (as in the normal song); this is the only time that he ever makes any attempt at singing when he can see the female. Mr. Falconer gives the usual hours for the subsong as being between 2 and 5 p.m.—he was working in Switzerland. I found that the usual hours here were between 10.30 a.m. and 1.30 p.m.

ADJACENT TERRITORIES AND THEIR EFFECT ON SONG.

B and C held adjacent territories in the confined space of a garden, and three pairs held adjacent territories in a triangular area round a farm-drive bounded by two woods and a very steep hill about one

mile inland from B and C. The songs of each of these five cocks are abnormal ; B and C tried to sing 1 and 1A with two high-pitched and highly accented notes before the " terminal flourishes," and two of the other three have unusually loud and explosive notes in the flourish (the third bird sings like B or C). Outside each of these two areas I heard Chaffinches singing normally as A or D. Mr. Falconer shows that the song takes fully a week to develop to full strength, but I was unfortunately unable to begin observations until the song period was well advanced. It might be suggested that in each of these two groups of birds the first one to develop full song made part of the song abnormally loud in trying to improve it out of rivalry. Then, as Mr. Falconer shows us, when the song period had advanced the neighbours began to " borrow " this song from it.

I have no doubt that if similar lines of study were applied to other short and simple songs much could be done in increasing our scanty knowledge of this subject.

NOTES.

CROSSBILLS BREEDING IN GREAT BRITAIN IN 1943.

As already briefly noted (*antea* Vol. xxxvi, p. 225) Crossbills (*Loxia c. curvirostra*) were reported in various districts in unusual numbers in the late summer and autumn of 1942. In response to our request, observers have sent information, details of which will be found below, of breeding having taken place in 1943. Apart from breeding the following counties may be added to those already given (*l.c.*), from which the birds have been reported as being present: Dumfriesshire and Northumberland (see below) and Leicestershire.

DUMFRIESSHIRE.—Crossbills during the winter were reported to Sir Hugh Gladstone from Upper Nithsdale in small numbers. Mr. Robert Chill, who lives at Shinnelwood has frequently seen two pairs in his garden and on April 18th, 1943 he watched both the cock and hen of one pair feeding a fledged young one.

NORTHUMBERLAND.—Mr. G. Aikenhead has already reported (*Field*, 17 iv, 1943, p. 409) that a number of Crossbills frequented spruce woods at Allenheads, near Hexham during the winter and that he had picked up several old birds which had died from some unknown cause. On March 8th, 1943 he picked up under a spruce an unfeathered nestling, which judging by its decomposed state he thought might have been dead about a month. The early date and place where it was found pointed to its being a Crossbill, but no nest was discovered. Mr. G. W. Temperley, who has made further enquiries, informs us that Mr. Aikenhead now reports that later, on March 21st, he actually saw a Crossbill feeding a young bird. He states, "I could distinctly see by the attitude of both birds that it was a young bird receiving food from a parent bird."

DURHAM.—Mr. Howard Watson, who has been watching Crossbills throughout the winter in Teesdale saw the first paired birds on December 6th. A tall spruce in which he had often seen a pair was blown down in a gale on April 6th. In a branch about three quarter's up the tree and well out from the trunk Mr. Watson found a nest with one broken egg, which appeared fresh, stuck to the bottom of it. There evidently had been other eggs. From Mr. Watson's detailed description of the nest it was no doubt a Crossbill's. On April 10th he saw a pair mating near this spot, but has no further evidence of actual breeding.

YORKSHIRE.—Mr. Ronald M. Garnett reports that a flock of about twenty Crossbills wintered on the fringe of the State forest near Thornton-le-Dale. Pairs were noticed on February 11th, 1943 and a hen was seen building on the 23rd, but this nest was subsequently destroyed (by a squirrel?) after eggs had been laid. Another nest was found on February 28th and this pair reared two young, which left the nest on April 3rd, but were still in the same tree on the 4th.

OXFORDSHIRE.—On February 14th, 1943 B. W. Tucker watched a hen Crossbill carrying material and laying a foundation of a nest in a tree in a garden at Headington. A brood was duly hatched, the adults being first observed carrying food on March 19th. After the 28th the young disappeared and it was feared they were taken by crows or squirrels. Up to eight Crossbills were seen in this garden earlier in the year and besides the pair which nested two other pairs were noted, while Crossbills have also been seen and pairs observed in other localities in the Oxford district, but there was no evidence that the birds actually bred in any of these localities.

Other observations, which cannot be regarded as indicating definite breeding may be mentioned.

On Reigate Heath (Surrey), on March 17th, Mr. L. I. Carrington saw a pair of Crossbills flying round the top of a Scots pine and later saw the female, accompanied by the male, go to the tree to a spot out of sight from the ground, with grass in her bill. The birds visited the tree again five times, but not carrying any material. In subsequent visits Mr. Carrington and others saw a Crossbill over the tree, but there was no further evidence of breeding and no young were observed.

In Ashdown Forest (Sussex), Mr. W. S. Medicott watched a number of Crossbills in pairs and flocks from March to May, and on March 27th he saw a male go to a nest high up in a pine, but could not see what it did there, and never saw a bird go to this nest again.

NEST OF BLUE TIT IN FORK OF TREE.

ON May 30th, 1943, at Limpsfield (Surrey) I found a nest of a Blue Tit (*Parus cæruleus obscurus*) with eight feathered young in a fork of a thick hawthorn tree. The nest was about thirteen feet up the tree where the stem divided into two fairly thick and two smaller branches. The stem was grown with ivy and this partly supported the nest. The nest itself was like that of a Blue Tit when built in a hole and was made wholly of new materials. There was no trace of an old nest of any kind either as a foundation or as part of the structure.

On several occasions I watched the old birds at the nest and on June 3rd found that the young had flown. K. R. CHANDLER.

WILLOW-WARBLER ADOPTING CHAFFINCH'S NEST.

ON May 13th, 1943 near Oswestry, I found a Willow-Warbler (*Phylloscopus t. trochilus*) covering three eggs in the nest of a Chaffinch (*Fringilla cælebs gengleri*) in the top of a quick thorn hedge, nearly five feet from the ground. One egg was damaged, this I very carefully removed. I revisited the nest on May 21st and found the Willow-Warbler sitting on three eggs. A few feathers had been added to the nest but no attempt had been made to "dome" it. Probably the Willow-Warbler's own nest had been destroyed after laying had started and the empty Chaffinch's nest was gratefully accepted as a substitute. J. H. OWEN.

GARDEN-WARBLER FEEDING YOUNG CHAFFINCHES.

ON June 30th, 1942 near Oswestry, I was watching a pair of Chaffinches (*Fringilla cælebs gengleri*) taking food to their nest, when I noticed that a single Garden-Warbler (*Sylvia borin*) was taking food to the spot. On proceeding to investigate more closely I soon found that the Garden-Warbler was actually feeding the young Chaffinches and that the real parents objected to this when they caught the intruder at work. Cases of a bird of one species feeding young in the nest of a very different species are not really uncommon. J. H. OWEN.

DISPLAY IN THE BARN-OWL.

LITTLE detailed observation of the display of owls appears to have been recorded probably due to the nocturnal habits of many members of the order. It is of interest therefore, to record a remarkable

display of the Barn-Owl (*Tyto a. alba*) which we witnessed recently in a Norfolk barn.

On the evening of June 3rd, we were in a hide placed before a Barn-Owl's nest, which was situated in a wicker "bullock skep." The nest contained 4 young, the largest of which was 13 day's old. About 9.30 p.m. (D.S.T.) the cock Owl arrived back in the barn, and was closely followed by the hen. Neither bird had brought prey, and both perched on a beam in such a position that they were well illuminated by the light from a comparatively large "loading-trap" through which they gained entrance to the barn. The cock bird paid a fleeting visit to the young, but returned at once to the hen, alighting alongside her about a foot away and facing in the same direction. There followed a certain amount of beak-snapping, presumably by both birds, and then the cock slowly extended his head and neck upwards, until the latter was fully extended, when the neck and throat feathers were puffed up to a remarkable degree. His beak was wide open and his head thrown well backwards. He then proceeded to sway his head from side to side and then to roll it round in curious snake-like motions. Meanwhile the hen bird swayed in sympathy and emitted a snoring note, well described by *The Handbook's* phrase "a purring chirrup." She then moved sideways towards the cock, who lowered his head and both birds proceeded to rub "cheeks" together. This appeared to involve the use of the feathers at the edge of the facial discs. The two birds then clicked their bills one against the other, and then the cock seized the female's neck widely in his bill and swayed her from side to side, the hen meanwhile purring intermittently. After this both birds stood quietly together for a moment and then left to commence hunting. This display took about 10 minutes to complete.

ERIC J. HOSKING.

STUART SMITH.

OSPREY IN SUSSEX.

On June 20th, 1943 I bought an Osprey (*Pandion h. haliæetus*) from a boy who was fishing in the Arun. He told me that the bird had dived into mid-stream, apparently got into difficulties and scrambled to the west bank, where he caught it. I took the bird to the London Zoo and am informed that it appears to be uninjured.

M. C. HARMAN.

BITTERN CHASING WHITE-FRONTED GOOSE.

On the evening of May 20th, 1943 Mr. Eric Hosking and I were at the edge of Hickling Broad when I saw a Bittern (*Botaurus s. stellaris*) about 80 yards up flying at the greatest speed I had ever seen one make. It flew directly away when I noted it was following a White-fronted Goose (*Anser a. albifrons*) we had previously seen settle on Hickling Broad. I watched both until out of sight fully two miles away. A few minutes later they returned over the Broad both flying full out, and I could see that the Bittern was chasing the Goose, which was keeping about 50 yards ahead.

Then the chase kept on by the Goose flying round and round in wide circles of about two miles. At times the birds were about 130 yards high. The Goose was trying hard to shake off the Bittern and did not relish this persistent following so closely on its tail.

After a full 20 minutes of this, the Goose planed down towards us at great speed, and the Bittern planed too with equal speed. The Goose went down on the open water, but behind a point of reeds which hid it from our view. The Bittern came within a few feet of it, but carried on to alight in a reed-bed 50 yards away.

I have seen Bitterns rise from their nests and chase off Marsh and Montagu's Harriers, but I have never seen one chase any bird for so long, at such a speed or height, and was very glad Mr. Hosking was there to witness this extraordinary incident. JIM VINCENT.

DISPLAY AND SEXUAL BEHAVIOUR OF WHOOPEE SWANS.

ON May 31st, 1934, on a Scottish loch six Whoopers (*Cygnus cygnus*) were seen swimming in circles and trumpeting with neck stretched up, occasionally making dabs towards each other, but never actually touching. They then began to flap their wings and beat the water with them, with necks sometimes laid along the water and sometimes raised with trumpeting notes. Next the birds raised their bodies in the water and walked on it, doing a sort of goose-step, legs well lifted each time, head erect and wings held out as if balancing. Then all sank on the water with more trumpeting. One bird dashed at another and pecked its neck and the two rose up breast to breast for a moment, then sank down again and all swam calmly away. In April, 1936, on the same loch a somewhat similar display was seen, with eight birds taking part. Some swam rapidly round in circles with neck outstretched, calling loudly and excitedly. There was some "goose-stepping," making a great splashing with the feet, the birds then facing up breast to breast and lungeing at each other, but without obvious animosity.

On May 23rd, 1936, on another loch, two birds were seen, one swimming rather low in the water, the other flapping its wings, raising the body from the water and trampling around. There was much splashing and noise, but no calling was heard. The female next raised her head, rose in the water facing the male and flapped her wings two or three times. Both then circled round each other several times, flapping wings and raising their bodies, but the splashing was so great that it was difficult to see what was happening. The male mounted the female, who sank down on the water, and presumably coition took place, but there was still much splashing by the male and the birds were partially hidden by reeds.

W. M. ROSS.

[These observations should be compared with the summary, mainly derived from the accounts of Heinroth and Christoleit, in *The Handbook of British Birds*, Vol. iii, pp. 169-70. The water-treading, according to Heinroth, is an aggressive display, while

the rising up breast to breast is a sexual one, but in much of the communal behaviour actions which appear primarily aggressive and others more distinctively sexual seem to be a good deal intermingled and should probably not be too rigidly differentiated.—B. W. T.].

BREEDING OF THE GOOSANDER IN NORTHUMBERLAND.

IN 1941 I reported (*antea*, Vol. xxxv, p. 38) that a pair of Goosanders (*Mergus m. merganser*) had attempted to breed on the banks of the river Coquet, about ten miles west of Rothbury, Northumberland; but that the nest was disturbed and deserted. In 1942 a watch was kept, but although the birds were seen as late as April 25th no nest was found. In 1943, however, the duck laid eight eggs in the same hollow alder stump and the whole brood successfully hatched out. The nest was found on April 23rd when it contained an incomplete clutch of three or four eggs. Incubation began when there were eight eggs. The duck was still sitting on June 4th, but by the following afternoon the nest was empty and the egg-shell fragments showed that a successful hatching had taken place.

This is the first record of the successful breeding of the Goosander south of the Border.

GEORGE W. TEMPERLEY.

[It may be noted that Nithsdale, where Goosanders have nested in recent years (*antea*, Vol. xxxvi, p. 59), though in Scotland, is at about the same latitude as the Northumberland locality. It may be added that two Goosander nests, from which young hatched, were reported to us this year (1943) by M. Peters, who also sent down and feathers, from near Moffat, another locality in Dumfriesshire.—EDS.]

DISPLAY OF COMMON SANDPIPER.

A PAIR of Common Sandpipers (*Actitis hypoleucos*) on the Isle of Tanera, off the west coast of Ross-shire, were seen on May 13th, 1943, to be performing an action not recorded in the *Handbook of British Birds*. Both sexes were displaying in the ordinary fashion of lifting one or both wings and holding them aloft as they tripped forward, trilling excitedly, breaking into circular flights, still trilling and with wings abnormally fluttering and wing-beats rapid. Sandwiched in these bouts of conspicuous display were periods lasting up to 10 minutes or so of apparent repose, wherein the birds stood still one to two feet apart, with subdued trilling, and at intervals of one-half to one second raised and lowered the nictitating membrane in a kind of "wink." The membrane and orbital ring was greyish white, and the display was visible to human eyesight at a distance of about four to five yards. Quite often the beak was tucked into the scapulars as if in the posture for sleep, with the membrane worked as above. To the observers this had the appearance of a kind of private display effective at short range.

AVERIL MORLEY,

F. FRASER DARLING.

SCANDINAVIAN LESSER BLACK-BACKED GULLS IN CO. CORK.

ON March 3rd, 1942 I watched a party of nine Lesser Black-backed Gulls resting on a sandbank near the Mizen Head. Some Great Black-backed Gulls were standing beside them and as I examined each bird in turn with my glasses I could see no difference in the colour of their mantles and those of the larger birds, all being equally dark. The light was excellent and I came to the conclusion that these birds were of the Scandinavian race—*Larus fuscus fuscus*.

J. E. FLYNN.

IVORY-GULL IN DUMFRIESSHIRE.

AN Ivory-Gull (*Pagophila eburnea*) was shot at Glencaple, Dumfriesshire on March 1st, 1943, while it was feeding on a dead Lapwing. It was in full and perfect plumage and on dissection, proved to be a male.

HUGH GLADSTONE.

EARLY NESTING OF SUMMER MIGRANTS IN 1943.—Correspondents have sent us details of a number of instances of early nesting in 1943 of summer migrants and the following seem worthy of note.

TREE-PIBIT (*Anthus t. trivialis*).—In a nest in Herefordshire, young hatched on May 20th, indicating that the first egg was laid about May 1st (Guy L. Charteris). A still earlier nest in Wiltshire with three eggs on April 25th has already been recorded (*antea*, p. 18).

WILLOW-WARBLER (*Phylloscopus t. trochilus*).—In a nest in Herefordshire, young hatched on May 14th, indicating that the first egg was laid about April 26th (Guy L. Charteris). In Shropshire several had one or two eggs before the end of April. One was incubating seven eggs on May 5th (J. H. Owen). The eggs in the deserted nest described by R. E. Williams (*antea* p. 36) were no doubt laid in April. This was in Hampshire.

GARDEN-WARBLER (*Sylvia borin*).—In Shropshire the first nest found had four eggs on May 6th (J. H. Owen).

BLACKCAP (*Sylvia a. atricapilla*).—In Shropshire on April 26th one was sitting on five eggs and several other nests had eggs before the end of the month. Capt. F. Evans found one sitting on five eggs on April 9th—a quite extraordinary date (J. H. Owen). In Herefordshire young about two days old were found on May 9th and three were found incubating in Berkshire on May 2nd (Guy L. Charteris). In Hampshire one had three eggs on April 28th (R. E. Williams). In N. Devon a nest had four eggs on April 18th (J. A. Nelder).

WHITETHROAT (*Sylvia c. communis*).—In Shropshire a nest with one egg on April 30th; another with four eggs on May 3rd (J. H. Owen). In Herefordshire two sitting on May 9th (Guy L. Charteris).

REDSTART (*Phœnicurus ph. phœnicurus*).—In Derbyshire a nest with two eggs on April 28th (A. E. Moore). In Herefordshire several broods out of the nest at the end of May (Guy L. Charteris).

CUCKOO (*Cuculus c. canorus*).—In Herefordshire a young one left a Hedge-sparrow's nest on May 31st and the egg must have been laid at the end of April (Guy L. Charteris). In Hampshire the egg referred to by R. E. Williams (*antea* p. 36) was also laid at the end of April or beginning of May. Mr. Charteris has records of eggs found on May 1st in other years.

COURTSHIP FEEDING OF NUTHATCH.—In *The Handbook of British Birds*, Vol. i, p. 242, it was mentioned that feeding of the female by the male is recorded as regular in *Sitta europæa cæsia* and that the

same was also doubtless true of the British Nuthatch, though no positive records were available. Mr. R. H. Casson writes to us that he has twice observed courtship feeding during the present year, on April 26th and May 24th. Since the publication of *The Handbook* it has also been observed in mid-April by B. W. Tucker. On the latter date mentioned by Mr. Casson the female would probably be incubating.

GLAUCOUS GULL IN PEMBROKESHIRE IN SUMMER.—Mr Douglas S. Miller informs us that his friends Messrs. F. Banfield and G. Giles had excellent views of an immature Glaucous Gull (*Larus hyperboreus*) at the Stacks, Pembrokeshire on May 14th, 1943. The observers are Canadian ornithologists very well acquainted with the species in their own country.

ICELAND AND GLAUCOUS GULLS IN MIDLOTHIAN IN SUMMER.—Mr. R. G. Thin sends us particulars of birds of these species observed by him at late dates at Granton.

An Iceland Gull (*Larus glaucoides*) was seen in 1941 on May 12th, June 7th and 11th, in 1942 one was observed on March 27th and April 15th and in 1943 one was noted on June 17th and 23rd.

A Glaucous Gull (*L. hyperboreus*) was seen on June 11th, 1941 in company with Herring-Gulls and the Iceland Gull recorded above under this date and its much greater size was very striking.

REVIEW.

A Study of the Little Owl (*Athene noctua*) in New Zealand. By B. J. Marples. *Trans. R. Soc. of New Zealand*, Vol. 72, Part 3, pages 237-252, December, 1942. MR. MARPLES undertook, in 1938, to make a thorough investigation of the Little Owl from every possible aspect and he read his conclusions before the Otago Branch of the Royal Society in December, 1942. This species of owl had been introduced into the South Island in successive years between 1906 and 1911. The object of the importation was to keep down, if possible, the numbers of other introduced birds. The Little Owl increased and spread and in the opinion of some people it became a menace to the native birds. An investigation of its food habits would naturally verify or refute this accusation if made on a large enough scale. Accordingly the stomach contents of 242 Little Owls were subjected to a microscopic examination. It was found that caterpillars, beetles and other invertebrates preponderated enormously in the food of the species. Twenty-two stomachs contained bird remains. Of these only one was possibly a native, namely the Fantail (*Rhipidura fuliginosa*). The rest were introduced Passerines. In 17 nests and pellets 82 birds were found, of which one, the White Eye (*Zosterops halmaturina*) is native. 7 recorded "larks or pipits" may have been the introduced *Alauda arvensis* or the native *Anthus novaseelandiae*. The remaining 74 were introduced birds, among which House-Sparrows greatly predominated. This interesting investigation proves that there has been very little change in the food habits of the Little Owl in its new environment. Rodents, however, are taken far less freely than in England and traces of only 25 mice and 9 rabbits were found in all the material examined. The results of the investigation run on parallel lines with those of that organized in 1936 by the British Trust for Ornithology and any differences in the food are of degree and not of kind. Mr. Marples also included in this treatise the results of his work on the endoparasites, and on the seasonal variations of weight both of the bird and of its gonads.

A. H-W.

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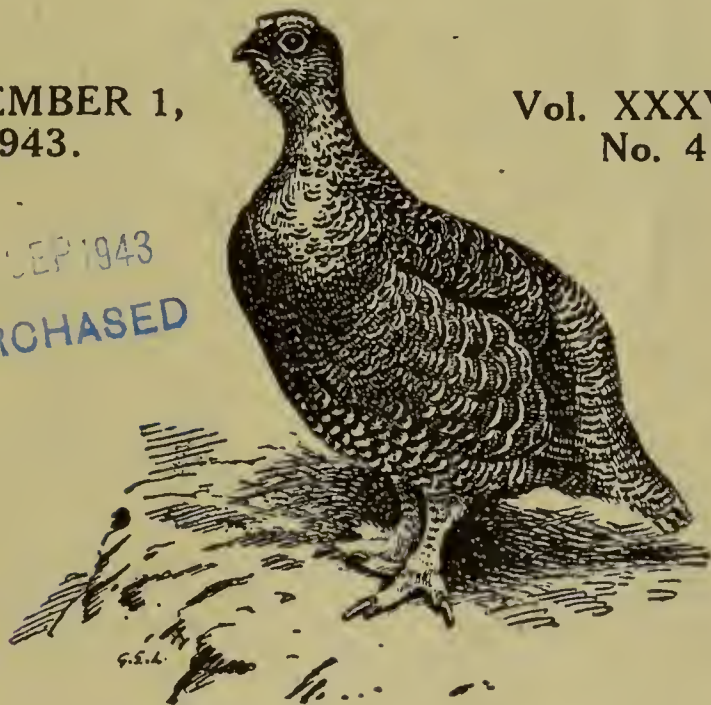
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THE MIGRATION OF THE SANDWICH TERN

RESULTS OF BRITISH RINGING*

BY

A. LANDSBOROUGH THOMSON, C.B., D.Sc.

I.—THE DATA.

DURING the period 1909-1942 young of the Sandwich Tern (*Sterna s. sandvicensis*) were ringed in the British Isles to the number of 17,987. Three colonies on the north coast of Norfolk have together made the largest contribution to this total, followed in order of importance by the Farne Isles, off the coast of Northumberland, and by two localities a few miles apart—Ravenglass in Cumberland and Walney Island in the north of Lancashire. Smaller numbers have been marked at various places on the east coast of Scotland, from the Firth of Forth to Aberdeenshire, and in northern Ireland.

Up to the time of writing, 317 of these birds have been recovered, making 1.76 per cent. Of these records about a third merely reflect infant mortality: the remainder all involve some degree of movement, and the proportion from abroad—and indeed from Africa alone—is high. Most of the records of individual interest have been listed at one time or another in these pages, by the Editor of *British Birds* or by the Hon. Secretary of the Bird-Ringing Committee of the British Trust for Ornithology. A summary map by Miss Leach appeared in 1941 in *The Handbook of British Birds*, Vol. v.

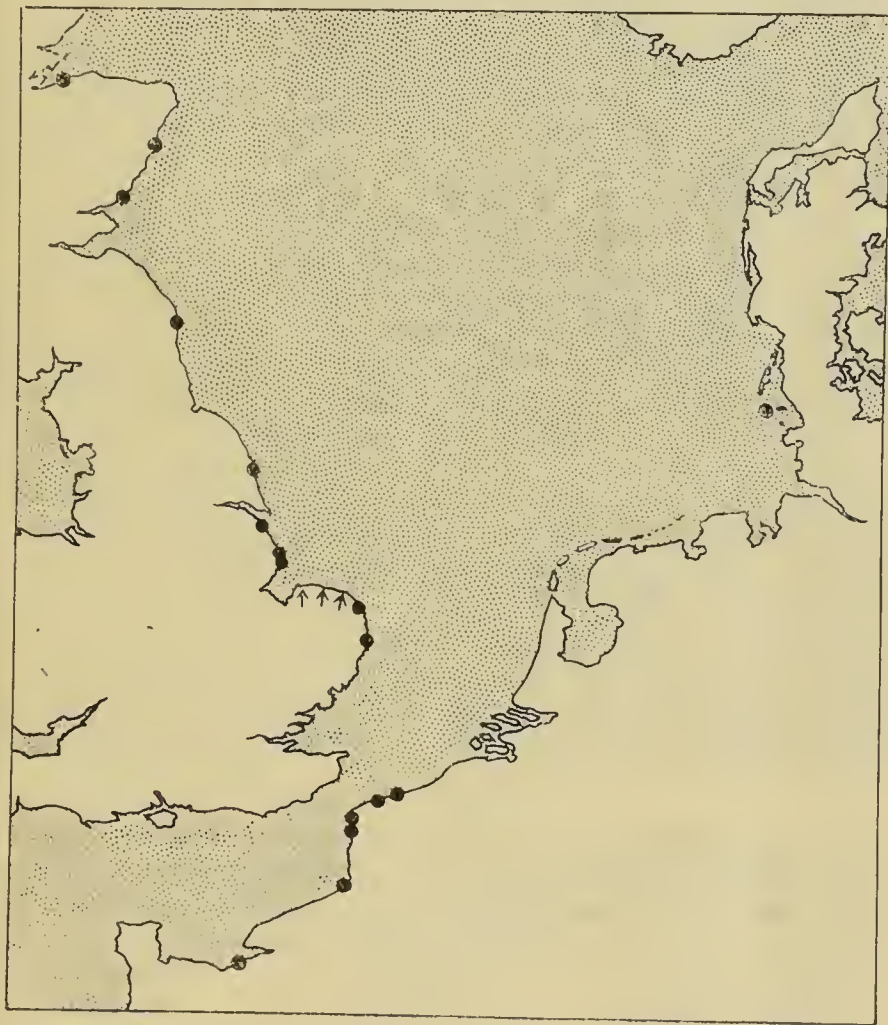
The purpose of the present paper is to analyse the data in detail. It may be said at the outset that this analysis has yielded less additional information than might have been expected in view of the number of records. The statistics of ringed birds of this species appear to be very much affected by chance or by disturbing factors. The fact that of 81 recoveries of birds over a year old one has fallen in February may be taken as illustrating mainly the effect of pure chance. On the other hand, the absence of records from some parts of the African coast-line which must obviously be traversed by the birds may be chiefly due to factors which influence reporting. The most important gap is from Agadir to Dakar, some fifteen degrees of latitude, but this stretch is sparsely inhabited. More remarkable, at first sight, is the entire absence of records from Nigeria, as compared with nearly fifty from the Gold Coast and over fifty from Angola further south. Bannerman in *Birds of Tropical West Africa* (Vol. ii, 1931, p. 256) makes no mention of this species in Nigeria, but he has since (personal communication) obtained information about its occurrence there in small numbers at all times of year. His informant, Sir Bernard Bourdillon, points out that the length of coast in Nigeria suitable for these birds is relatively short, and that this shore is not readily accessible to human beings: these facts doubtless explain the lack of records.

*Publication of "The British Trust for Ornithology."

II.—PRELIMINARY DISPERSAL.

Young Birds.

There are 102 records of young birds recovered at their native localities in the season of ringing—45 in June, 46 in July, 8 in August, 2 in September, and 1 in October. Several of the later records mention that the birds had been long dead when found, and in other cases there is no definite indication that they had survived until about the date of report. The whole of this group of records is therefore excluded from further consideration: most, and possibly almost all, may be taken as relating to the flightless period.



PRE-MIGRATORY DISPERSAL OF YOUNG SANDWICH TERNS.

Recoveries of Norfolk-bred birds in July and August of first year.

Black spots represent recoveries; small arrows indicate native localities.

(Drawn by Margaret Rees, B.Sc.)

Next come 31 records from parts of the British Isles more or less distant from the respective localities, and falling in July, August and September of the first year. With these may be taken 11 records (7 in August, 3 in September, and 1 in October) from neighbouring continental coasts. These records together indicate a pre-migratory

dispersal, but where the direction is southward it is not possible to differentiate this movement clearly from the beginning of definite migration.

In many cases the first movement is northerly in trend. A bird ringed in Fife on June 29th was recovered in Aberdeenshire, 65 miles to the north, on July 1st, showing that a bird may move away as soon as it can fly. Before the end of July a Cumberland bird reached Perthshire (155 miles northward and inland), and a Norfolk bird reached Angus (285 miles northward): on the other hand, an Irish bird from Co. Down reached Co. Waterford (170 miles southward). The other two July records show much shorter journeys.

In August, for which there are 26 records, Norfolk birds have been found as far north as Aberdeen and Nairn (305 and 365 miles) and as far south as the Normandy coast in Calvados (250 miles): one was reported from Amrum in the East Frisian Islands (340 miles in a north-easterly direction), the only record in the whole series from the other side of the North Sea. The absence of records from the south coast of England is noteworthy, but may be due to fewer birds being shot—as most of the French birds were. Birds from the Farne Islands have been found as far north as Banff and Moray (145 and 155 miles) and as far south as Norfolk, in the neighbourhood of one of the colonies there (200 miles). A Cumberland bird was reported from Portrush in Northern Ireland (135 miles north-west), and a Fife bird from Yorkshire (135 miles south).

In early September there are two records of Norfolk birds still north of their native localities—one on the 2nd in Co. Durham and the other on the 4th in East Lothian (145 and 255 miles)—and even later in the month some remain at short distances to the south or on the Channel coast of France. Definite migration begins during the month, however, as will be noted below.

Table I shows the distribution of first year records during July and August in relation to point of origin, and the map shows the actual recovery localities of Norfolk young birds during the same period.

TABLE I.
RECOVERIES DURING FIRST JULY AND AUGUST OF YOUNG
SANDWICH TERNS RINGED IN BRITISH ISLES.
(Excluding records from birthplace mostly attributable to the
flightless period.)

<i>Distance from birthplace (miles)</i>	<i>Northerly directions</i>	<i>Southerly directions</i>
0—100	9	6
100—200	5	8
200—300	1	1
300—400	3	—

The data faintly suggest that the dispersal may have a northerly bias—the number of birds taking this direction is only slightly greater, but some of the distances covered are longer than any of those recorded towards the south at early dates.

Older Birds.

There are 8 records of recovery in Great Britain subsequent to the first year of life. Only one of these suggests a northerly movement after the breeding season such as is performed by some young birds, but with so small a total negative evidence is of little value.

III.—MIGRATION.

Young Birds.

In addition to the records dealt with above, there are 92 recoveries during the first year of life (reckoned arbitrarily to the end of May) which trace the course of the southward migration. This follows the Atlantic seaboard of France, Spain, Portugal and the African continent. It branches, also, into the western Mediterranean with single records from south-eastern Spain, eastern Spain, Spanish Morocco, Algeria and the western tip of Sicily. The West African records are from Morocco, Senegal, French Guinea, Sierra Leone, Ivory Coast, Gold Coast (numerous), French Equatorial Africa, Angola (numerous), South-west Africa and Cape Province.

As already mentioned, definite migration of young birds becomes evident in September, although some are still dispersed on British coasts: a Farne Islands bird has been recorded from the extreme south of Portugal by the end of the month. Before the end of October two birds have been recorded from the Gold Coast and one from southern Angola, but there is still a record in the middle of the month from the English Channel.

In November, records from the Gold Coast and Angola predominate, although there are still records from southern Spain and Portugal. In December all the records are from the tropics. Early in January there is a record from Port Elizabeth, Cape Province: that is also the month of the Sicilian recovery already mentioned, and there is one from the north coast of France that must be regarded as aberrant. The records for February, March, April and May are nearly all from West Africa—from Senegal to South-west Africa—the exceptions being a bird from near Barcelona in March and one from Algeria in mid-May.

(Continuing into the second year, it may be said that the 4 records for June and 3 for July are all from the tropics. If it were not for a single August record from Great Britain itself, and a September one from the French coast of the English Channel, there would indeed be no evidence of a return migration on the part of birds one year old).

Table II gives a month by month analysis of the latitudinal distribution of first year records, including both the dispersal and the migration phases. A point of interest is that until February records from the northern tropics (especially Gold Coast) are more numerous than those from the southern tropics (especially southern Angola), but that in March and April the position is reversed: this may indicate a southward shift late in the season, which again suggests that few birds perform a northward migration at this age.

(For the purposes of the table, one "Jan. or Feb." record has been allotted to January and one "Mar. or Apr." to March—both from the northern tropics; two "winter" records, from the northern and southern tropics respectively, have been entered under January. "Native Area" includes the British Isles and the continental coasts of the North Sea and English Channel: the figures for the North Temperate Zone are exclusive of those for the Native Area).

TABLE II.

RECOVERIES DURING FIRST YEAR OF LIFE OF SANDWICH TERNS
RINGED IN BRITISH ISLES.

(Excluding records from birthplace mostly attributable to the flightless period.)

Zone	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Native Area ..	—	7	26	8	1	—	—	1	—	—	—	—
North Temperate ..	—	—	—	4	3	3	—	1	—	1	—	1
North Tropical ..	—	—	—	—	2	4	6	14	14	2	1	4
South Tropical ..	—	—	—	—	1	4	3	4	1	7	6	4
South Temperate ..	—	—	—	—	—	—	—	1	—	—	—	—
Total (134) ..	—	7	26	12	7	11	9	21	15	10	7	9

Older Birds.

There are 81 records of birds more than one year old, including 8 records in Great Britain which will be considered further below.

In comparison with those for young birds, the chief point of interest in the migration records is the larger proportion of reports from south of the Tropic of Capricorn. Out of a smaller total there are seven as against one. Moreover, they extend the migration range round the Cape of Good Hope and northwards up the east coast to Natal. The distribution is:—South-west Africa 1, Cape Province 3, Natal 3. There is thus some ground for supposing that there is a tendency for older birds to travel further at the extremity of the migration, but this may be due to extended wandering on the part of individuals which have been absent for more than a year from their native latitudes.

TABLE III.

RECOVERIES AFTER FIRST YEAR OF LIFE OF SANDWICH TERNS
RINGED IN BRITISH ISLES.

Zone	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Native Area ..	1	5	5	1	—	—	1	—	—	—	2	—
North Temperate ..	—	1	2	2	1	1	—	—	—	1	—	—
North Tropical ..	2	2	1	2	3	3	2	1	—	1	3	4
South Tropical ..	3	1	6	—	—	7	2	1	—	2	4	1
South Temperate ..	—	—	1	—	—	1	—	2	1	1	1	—
Total (81) ..	6	9	15	5	4	12	5	4	1	5	10	5

That many birds do remain in the south during what should be their breeding season is clear from the records, and this applies to birds of all ages. Table III gives a month by month analysis of the latitudinal distribution of the recoveries of birds upwards of one year old. The separate figures are too small, however, to permit of

more than quite general inferences, such as are obvious from inspection.

Speed of Migration.

It is necessary to refer to a previously published interpretation with which, under this head, the present writer is unable to agree. In a pleasing and interesting book by G. & A. Marples (*Sea Terns or Sea Swallows*, London, 1934 ; at p. 80) the British ringing data for terns, and it seems particularly for the Sandwich Tern, are cited in support of a hypothetical probability that the further the birds travel the faster they fly. It is suggested not merely that the average speed of the longer journeys is higher, but that this is due to an acceleration of the pace of travel as the distance from the starting point increases: the reason for preferring the latter view is not clear, but the argument appears to be inadequate in either case. The calculations of average rate of travel are based, firstly, on the explicit assumption that migration begins thirty days after ringing. Actually, many of the young birds are still within the preliminary dispersal area, and sometimes north of their native localities, much later than this. There is also no evidence that the birds ringed in early June begin definite migration sooner than those ringed in mid-July. On another and perhaps more likely assumption, the examples given in the book can be made to yield a contrary result. Secondly, there seems to be an implied assumption that a bird recovered at a distance has just arrived at that point—which is quite unwarranted. It is therefore safer to conclude that the data provide no reliable basis of calculation in this regard.

IV.—RETURN TO NATIVE AREA.

There are only 8 records of recovery in the British Isles in years subsequent to that of ringing. This small number may indicate that the breeding season is, except for young birds, the time of the lowest mortality. The age distribution is as follows :—

Second year	1	Fifth year	4
Third year	2	Sixth year	1

The figures are small, but having regard to the age distribution of the records in general (given below), the single record of a yearling does suggest that the proportion of birds returning to the breeding area at that age is smaller than the proportion returning at later ages. There is in addition, for what it may be worth, a sight record reported by the late H. W. Robinson (*British Birds*, 1910, vol. iv, p. 88) of a ringed bird said to have been seen on its nest at Ravenglass one year after the first marking of this species in the British Isles.

One of the fifth year birds was stated to have been shot in December, possibly due to delay in reporting: the other records fall in June, July and August. One fifth year bird was reported from its native colony, and the second year bird from the near neighbourhood of its birthplace. In three other cases the distance from the point of origin was less than 40 miles. These records suggest that return is often exact.

A change of colony, however, appears to have been made by a bird ringed in July, 1914 on the Farne Islands and found dead on July 15th, 1919 at Ravenglass—a breeding place 112 miles distant in a south-westerly direction and on the opposite side of England. The remaining two records are equivocal, in view of the possibility that adults as well as young disperse widely after the breeding season: both birds were ringed on the Farne Islands and were recovered in mid-August of the third year, one in Ross-shire (170 miles northward) and the other in Norfolk (200 miles southward).

There are no records definitely suggesting that the return is ever to parts of the breeding range outside the British Isles. There are, however, three July records from France—a Lancashire bird in its third year and a Norfolk bird in its sixth year from the Channel coast, and a Norfolk bird in its seventh year from Dept. Aude on the Mediterranean: none of the localities is in a known breeding area. Records from France from August onwards, and again in April, may well refer to migration. There is a record of a Norfolk bird from Algeria on August 11th of its second year, which is equivocal because of the early date and the fact that the species breeds in Tunisia and Sardinia.

V.—AGES OF RECOVERED BIRDS.

As already noted, 134 records fall in the first year of life, reckoned to the end of May, not counting 102 recoveries of young birds before they had left their native localities. The age distribution of the remaining 81 cases is as follows:—

Year of life :	2nd	3rd	4th	5th	6th	7th	9th	14th
Number ...	37	15	16	6	2	3	1	1

The details of the two oldest birds are:—ringed Lancashire, June 1927, recovered Gold Coast, May 1936; ringed Cumberland, June 1917, recovered Luderitz, South-west Africa, February 1931.

VI.—BIRDS RINGED ABROAD.

Sandwich Terns have also been ringed in some numbers in Holland, north-west Germany, Denmark, and southern Sweden. The published records indicate a migration which is, from the Straits of Dover to South Africa, similar to that of the British birds: in addition there are naturally recoveries from nearer the respective places of origin, and these include one of a Danish bird from inland Germany, near Leipzig.

Three Danish birds have been recovered on the east coast of England in the late summer of the year of marking, either on migration or during preliminary dispersal. A record of a bird ringed in Holland and recovered in Norfolk early in August of its fifth year may possibly indicate a change of breeding locality—of no great extent—in the particular instance.

There is also one known record of a Russian bird, ringed on the Black Sea coast of the Ukraine and recovered next spring off the east coast of Tunisia. No ringing data are available relating to the birds which reach the Red Sea, Arabian Sea and Persian Gulf in

winter : they not improbably come from the breeding places in the Black Sea and Caspian Sea areas.

The allied American race is not considered in this paper.

VII.—CONCLUSIONS.

The following conclusions can be drawn from the recovery records of Sandwich Terns ringed in the British Isles as young birds :—

(1) Some young birds leave their native localities as soon as they can fly. A dispersal begins in July, develops in August and persists to some extent in September. The movement takes place along the coasts of the British Isles, and in the case of Norfolk birds extends to the French coast of the English Channel : easterly movement across the North Sea also occurs, but probably only to a slight extent.

(2) This dispersal of young birds has possibly a slight northward bias.

(3) There is little evidence from this source either for or against a possible similar dispersal on the part of older birds after the breeding season.

(4) Migration follows the Atlantic coasts of Europe and Africa southwards to the Cape of Good Hope, and then continues eastwards and northwards as far as Natal. There is also a movement into the western Mediterranean as far as Sicily.

(5) Definite migration of young birds supersedes dispersal in September, and the south of Portugal is reached by some birds by the end of the month. Southern Angola is reached by some birds by October : the only record of a first-year bird from Cape Province is for early January.

(6) Some of these first year birds remain in the North Temperate Zone into November, and many probably never cross the equator as there are records from the North Tropical Zone throughout the winter. There is, however, an indication of some southward shift, from the North Tropical to the South Tropical Zone, as late in the season as the end of February.

(7) There is an indication that older birds more often reach Cape Province than do birds in their first year, and that possibly only old birds reach Natal.

(8) Some birds, of all ages from one year upwards, remain in the Tropics throughout the breeding season instead of migrating northwards.

(9) Others return to their native area. The return is sometimes (probably often) to the exact native locality, but there is one record in this series of an apparent change of colony—from the east to the west coast of England. There is no evidence that return is ever to parts of the breeding range other than the native area, although there are a few equivocal records.

(10) Return to the breeding range is probably less frequent at the age of one year, although it does occur, than at later ages.

(11) Ages up to $13\frac{8}{12}$ years are known to be attained.

NEST-SITE SELECTION BY BIRDS

BY

CAROLINE AND DESMOND NETHERSOLE-THOMPSON.

THE late F. C. R. Jourdain writing on "Our Present Knowledge of the Breeding-Biology of Birds" (*antea*, Vol. xxiv, p. 135) remarked: "Every detail of the life of the bird is important. For example most valuable and interesting light is thrown on the relationship of the small passerine birds by noting the different shares of the sexes in the choice of the nesting-site and actual building and lining of the nest." This was written twelve years ago, but judging from the generally incomplete and scanty accounts of nest-site selection sparsely scattered through ornithological literature, progress has been disappointingly slow. This has been largely due, however, to peculiar difficulties of observation, failure to concentrate upon the problem, and, last, but not least, by the diffidence shown by many excellent field-ornithologists in publishing their interesting notes. The object of this paper is, therefore, to summarise what is already known and to adduce fresh evidence, based on original observations, in the hope that others may thereby be stimulated to record their discoveries in this fundamental, but almost universally neglected, aspect of the breeding-biology of birds.

For many years now we have been observing the methods and share of sexes in nest-site selection and the considerable mass of data now contained in our notebooks forms the backbone of the present account, but it cannot be too emphatically stated that the telling of this story is in no way an individual accomplishment. In particular we wish gratefully to acknowledge the valuable assistance of the following observers:—

C. J. Bellamy, G. L. Charteris, G. Dent, the late John Douglas, G. A. Garceau, I. E. Hills, F. B. Kirkman, D. Lack, G. C. Low, John Markham, W. Marshall, the late Percy Meeson, D. W. Musselwhite, J. H. Owen, W. M. Ross, C. V. Stoney, D. Stubbert, Nat. Tracy, Jim Vincent, R. Ware and Arthur Whitaker.

Moreover, prior to the preparation of our manuscript, Mr. Witherby kindly allowed us to examine the late F. C. R. Jourdain's notebooks on breeding-biology, and although this was not a subject specially studied by Mr. Jourdain, nor one upon which he had kept systematic notes, we found in them a number of references to the literature with which we were unfamiliar. We wish, therefore, to express our appreciation for this important source of information. In the main, however, the British and some of the continental literature was worked out by one of us in the Bird Room of the British Museum (Natural History) and our most grateful thanks go to Mr. N. B. Kinnear for his advice and assistance.

In introducing the subject a few comments on its general aspects are essential. It is not yet possible to define the precise relationship of the site-selection impulse or instinct with those most closely allied to it, but it is already clear that in some species (*e.g.* Starling,

Tree-Sparrow and some of the tits, etc.) the impulse must be treated as a separate entity, not only because the actual nest-site may sometimes be chosen fully two months before building begins but in that the impulse may be final and complete as opposed to the material-dropping phase of birds, which have not yet attained the requisite physiological condition for nest-building. Moreover, in birds like Pied Flycatcher, Willow-Warbler, and Redstart in which the cock's share in building is normally negligible, he may select or attempt to select the nest-site prior to the arrival of the hen. The position in woodpeckers is, however, complicated because, as Mr. Tracy tells us, the cock Great Spotted Woodpecker may excavate a roosting-hole not only in the breeding-season, but also in the autumn. Again, site-selection proper may only follow after a prolonged spell of incipient-nesting or "scrape-making" (*e.g.* Red-necked Phalarope, Dotterel, and Lapwing), and in Greenshanks it is generally correlated with special behaviour and the raising of the emotional tempo of the pair of birds.

Extraneous factors—weather, concealment, food, and the general character and adaptability of the species, etc., likewise tend to restrict or influence the choice of a nesting-site and D. Lack (*antea*, Vol. xxxi, pp. 130-6) has also rightly emphasized the importance of psychological as well as environmental factors. Thus, the spread of the Peregrine Falcon in many British localities is impeded not only by persecution by game-preservers or pigeon-fanciers but because the species in this country has not yet evolved the tree-nesting habit recorded in many parts of the continent of Europe. Similarly we have found that whereas a few Greenshanks break away from local tradition by nesting close to stones in a locality in which a fragment of dead stick is the favourite "mark" beside which to place the nest, their number is few in comparison with conventional birds. So strongly, moreover, do the majority of Greenshanks dislike rank heather—presumably because they and their chicks find it difficult to traverse—that a well-established and otherwise well-found breeding haunt may be completely abandoned if the heather grows too long. Conversely an extensive forest fire may cause great change in status and distribution. Some years ago, for example, a large fire on a Spey Valley deer forest cleared some hundreds of acres of rank heather and this bare and blackened area proved so attractive to passing Greenshanks that the district was colonized by several new pairs the following spring, and this increase was maintained until the heather grew up again when the breeding-stock gradually declined to its former level. Between 1921 and 1942 we noted other considerable, if less sensational, population changes due to this cause, although the food supply has, we believe, remained constant.

The distribution of Willow-Tits in some districts is likewise apparently restricted by a shortage of suitable stumps (R. Ware) whereas Coal-, Great and Blue Tits are more adaptable in their nesting-site arrangements although L. S. V. Venables quoting W.

H. Thompson (*antea*, Vol. xxxii, p. 30) mentions that "Coal- and Marsh-Tits, as nest-site competitors fought a good deal whereas Willow-Tits excavated unmolested their nest-cavity."

Commensalism has been little studied in this country, but it possibly indirectly influences the selection of nest-sites by certain species. Mr. E. M. Nicholson, for instance, noticed that some of the Red-necked Phalaropes in East Greenland bred only in swamps in which Ptarmigan were nesting apparently because the latter was "the only local bird harmless in itself and yet sufficiently bold and vigilant always to repulse an approaching Skua" (*The Study of Birds*, p. 36). Likewise, in Scandinavia, Bramblings show an undoubted tendency to nest in Fieldfare colonies (B. W. Tucker). We have also met with rather similar, although less remarkable, instances of this procedure in Britain.

Coming to the more specialized problems of this phase, it has been discovered that, as in "re-courtship displays," site-selection behaviour, preceding the choice of situation for a second or "repeat" nest, tends to be scamped and that it may also be drastically curtailed if the pair of birds annually employ the same nest-site. Another interesting phenomenon is the occasional conflict of will or desire in the two sexes of a pair of birds, but in some such instances—Pied Wagtail (J. S. Elliott, *antea*, Vol. xxvii, p. 48), House-Martin (W. M. Ross), Lesser Spotted Woodpecker (N. Tracy) and Red-backed Shrike (J. H. Owen) sites chosen by the females were continued despite the intolerance or competition of their mates.

Variation in the technique of nest-site selection—even allowing for the difficulties and uncertainties of observation—is evidently considerable and many more records and notes are needed before our knowledge of the realities of the subject is to be considered even approximately complete. It must also be realised that many of our present records are fragmentary, as it is particularly difficult to determine whether one has or has not observed the earliest stage in the process. In this respect the vagaries of house-hunting Scottish Crossbills provide an object lesson from which the imprudent or over-optimistic can assuredly profit. Greenshanks are also difficult to master in this as in other phases of their breeding-biology. Thus, while the pair normally together seek a nest-site, the hen generally peremptorily disposes of the cock's proposals. Sometimes, however, the cock, perched on a dead tree, with rapid staccato whistling cries, drums up the hen and incites her to proceed with her task. Particularly fascinating to watch are the quirks of two hen Greenshanks mated to the same male, and we have then known all three birds, calling excitedly, to walk over the ground together, although one memorable evening another cock Greenshank accompanied his two wives, one after the other, on tours of inspection of the territories they coveted. When two hens lay together in the same nest one may dominate the other, but we once watched the formation of a new triangle and the nests—some 150 to 200 yards apart—were eventually constructed on the border of two former territories.

The Mistle-Thrush's arrangements are almost equally complex and baffling. Hens may brood for long spells in the selected crotches fully a fortnight before the foundations of the nest are laid (A. Whitaker and D.N.T.). Mr. J. S. Taylor, on the contrary, (*antea*, Vol. xxxi, pp. 233-234) observed a hen interest herself in the hollow formed by three branches of a sycamore tree around which she travelled for over five minutes. On this occasion also building was not commenced until some 16 days later, but Colonel B. H. Ryves determined that Mistle-Thrushes in north Cornwall only pick a nesting-site a day or two in advance of building (*antea*, Vol. xxii, p. 31).

Mention has already been made of the way in which the nest-site selection impulse may become atrophied by the employment of the same nest-site year after year. It certainly is noteworthy that one particular pair of Greenshanks—the hen instantly recognized by egg-type and the cock almost certainly by his great size and distinctive behaviour—have used the identical "scoop" for three consecutive years. Yet they had some thousands of acres of suitable flow from which to choose! It is also a well-established fact that certain caverns or ledges on sea or inland cliffs have some intangible fascination for successive generations of Peregrines as have particular patches on brae or hillside for Merlins. Mr. J. H. Owen (*antea*, Vol. xxx, p. 23) mentions that "In one wood of about sixty acres there is usually only one pair of Sparrow-Hawks. There are hundreds of trees in that wood that look eminently suitable for them to use. In spite of this a particular tree has been used by at least five different hen birds, new nests having been built by all of them, for the old nests were always poked down." Now, there is a considerable quantity of reliable evidence to show that in the event of the death of the hen males of many of the larger species search for mates and bring them to the old territory, where they may induce them to use the nests of the former wives (*e.g.* Raven and Peregrine), but there are also long-established nesting stations an accurate history of the tenants of which is unknown. It would indeed be interesting to know how far this continuity is caused by the influence of the survivor or its progeny, and how much it is due to the peculiar desirability of the nest-site itself. That, however, is largely a task for the future to determine.

In the appended systematic list all records are based on our own field-work, unless there is specific mention to the contrary. Data have been restricted to British breeding-species only, but we have added some records of nests or nesting-sites being employed for more than one brood or for two or more years in succession. It has been considered advisable, however, to exclude from this list records—of which we have many—of nest-site competition between different species (*e.g.* Great Spotted Woodpeckers ousting Lesser Spotted Woodpeckers from nest-holes, Starling dispossessing Green Woodpeckers, etc.)

It must also be added that our research work in 1939-1942 has

been largely financed by grants from the Leverhulme Research Fellowships Committee and the Institute for the Study of Animal Behaviour.

SYSTEMATIC LIST.

RAVEN (*Corvus c. corax*).

Cock brings new hen to his territory. This has been noted several times. In one case of new pairing the cock brought the hen to the actual nest built by former hen, which had been killed about a fortnight earlier. Second hen laid in this after slight additions to lining. Both sexes watched examining old nests, but female probably has casting vote. Same eyrie—particularly if in tree—may be used for a number of years (D.N-T.). Inspection of ledges by both birds in early February. Nests commenced in several places before decision taken (C. V. Stoney). In new pairings males select actual nest-sites (G. A. Garceau and G. Dent).

HOODED CROW (*Corvus c. cornix*).

Both sexes inspect possible nest-sites, going in and out of tree time after time. Female probably finally decides, but cock known to bring new hen, which built on top of an old nest of the cock's former mate.

CARRION-CROW (*Corvus c. corone*).

Both sexes appear to co-operate in site-selection (J. H. Owen and D. N-T.). Female laid twice in same nest after an interval of about 35 days (G. Took, *Brit. B.*, Vol. xxx, p. 80).

ROOK (*Corvus f. frugilegus*).

By both sexes, but hen's influence probably decisive. Same hen known to lay in same nest several years in succession. Nests selected and commenced by colonists away from rookery often destroyed by community. Both sexes may roost on future nest-site, and female frequently broods for long spells in crotch destined for nest. Coition and display may occur on actual nest-site before building is begun.

JACKDAW (*Corvus monedula spermologus*).

Single bird (female?) explored holes in ash tree. Mate present, but did not take part (2.1.43). In late March a pair seen flying from one rabbit-hole to another, both birds entering and leaving at short intervals (D. N-T.). Both hunt for site together. A pair after trying a hole in an oak tree for at least half an hour finally decided against it. Several successful selections observed (J. H. Owen). In N. Ireland inspection of future nest-sites noted from late December onwards. Both sexes participate, but one sex—presumably female—more than the other (C. and D. N-T.).

MAGPIE (*Pica p. pica*).

In some cases birds visit old nest in February to examine, and later to reline and repair it (C. V. Stoney). Apparently by pair in concert (J. H. Owen). Same tree sometimes used several years in succession (R. H. Brown, *Brit. B.*, Vol. xvii, pp. 123-4).

JAY (*Garrulus glandarius rufitergum*).

Apparently by pair in concert (J. H. Owen).

CHOUGH (*Pyrrhocorax p. pyrrhocorax*).

Both birds seen inspecting various caves and crevices, but female probably has final choice as same bird known to use old nest year after year.

STARLING (*Sturnus v. vulgaris*).

Male, later pair, may roost in future nest-site over a month before using it. Male also seen to choose nest-site before mating and then endeavours by entering it repeatedly to induce female to use it (C. and D.N-T.). Cock chooses site in January, gliding down and examining box. With coming of female, cock remains in box for longer periods, peeping out now and then, and occasionally plucking blade of grass or leaf, with which it flies to box. Meanwhile, hen goes in and out of entrance many times as though estimating suitability of accommodation (G. Marples, *Brit. B.*, Vol. xxx, pp. 14-15).

(To be continued).

NOTES.

UNUSUAL BIRDS IN BEDFORDSHIRE.

DURING the last year I have been able to pay regular visits to the Sewage Farm just outside the town of Bedford and amongst the many birds seen, the following seem worthy of note. I am grateful to Mr. B. O. Clifford and Mr. A. J. Swain for providing me with some of the notes.

I should mention that the Great Ouse forms the northern boundary of the farm.

WHITE WAGTAIL (*Motacilla a. alba*).—One male on April 8th, 1942.

GARGANEY (*Anas querquedula*).—One male on May 30th, 1943.

PINTAIL (*Anas a. acuta*).—One male with Mallard and Teal on January 9th, 1943.

RED-CRESTED POCHARD (*Netta rufina*).—A female seen on January 14th, 1943, was probably an escape, possibly from Woburn.

SCAUP (*Aythya m. marila*).—An adult female on the Ouse on December 31st, 1942.

GOLDENEYE (*Bucephala c. clangula*).—A pair noted on February 27th, 1943.

TEMMINCK'S STINT (*Calidris temminckii*).—One stayed from July 9th to August 2nd, 1942 and I was able to watch it on various occasions. When put up it always towered to some height and flew round, sometimes uttering a high pitched trilling note. On one occasion it returned and flew round close to me and as it banked I could see its white outer tail-feathers.

SANDERLING (*Crocethia alba*).—One in transitional plumage on August 9th, 1942.

RUFF (*Philomachus pugnax*).—One male present August 8th and 9th, 1942 and one on April 13th, 1943.

GREEN SANDPIPER (*Tringa ochropus*).—The following were seen in 1942, two June 11th, three 27th, four July 4th, nine 19th, fifteen 28th, three August 2nd, five 23rd, one September 15th, one October 11th, and one on January 14th, 1943.

WOOD-SANDPIPER (*T. glareola*).—A party of about 20 seen on June 7th, 1942. They were put up three times and after circling round came down again.

SPOTTED REDSHANK (*T. erythropus*).—One seen on April 13th, 1942 in company with two Common Redshanks had the head, neck and breast black, while the back and wings appeared mottled. There was no wing-bar and it was decidedly larger than the Common Redshanks and had duller coloured legs.

GREENSHANK (*T. nebularia*).—One on May 24th and three in August 1942.

BLACK-TAILED GODWIT (*Limosa l. limosa*).—Of a party of six observed on April 8th, 1942, four were in nearly full breeding plumage while the other two were immature.

CURLEW (*Numenius a. arquata*).—Single birds seen on March 8th and 20th, 1942, and one on April 2nd, 1943.

BLACK TERN (*Chlidonias n. niger*).—Mature bird noted on April 13th, 1942.

LITTLE GULL (*Larus minutus*).—A mature bird seen on May 7th, 1942. The small size, the tern-like flight, absence of black on primaries and black under surface of wings were the most noticeable characteristics. Once it uttered a note sounding like "koawee" which was repeated five times in quick succession.

QUAIL (*Coturnix c. coturnix*).—A bevy of about ten flushed from some long grass near the sewage works on August 9th, 1942.

J. A. MILLER.

LARGE RAVEN ROOST IN PERTHSHIRE.

EACH winter since the war a crag only a mile and a quarter from the village of Pitlochrie, Perthshire, and another rock within 300 yards of it have been occupied by very large numbers of Ravens (*Corvus c. corax*). The birds go out to the east every morning and return to roost at nights from the east and north-east. The biggest number counted on one night was a hundred and twenty two winters ago. On April 18th, 1943, eighty were counted and on May 1st forty, all in pairs on both dates. By May 3rd they had left. They also left very late in the season in 1941 and 1942. Mr. Seton Gordon suggests that the birds are migrants from Scandinavia.

E. J. FERGUSSON.

BULLFINCHES AND HOUSE-SPARROW EATING LEAVES.

As only about half a dozen of our Passeriformes are mentioned in the *Handbook* as eating leaves, it may be worth recording that on a single day this spring I was able to add two more, namely the House-Sparrow (*Passer d. domesticus*) and the British Bullfinch (*Pyrrhula p. nesa*).

For many weeks I had been watching almost daily three pairs of Bullfinches feeding. Their favourite food appeared to be the buds of the blackthorn (*Prunus spinosa*) and then those of the May (*Cratægus monogyna*). As the blackthorn came into leaf, the birds ate the tender new shoots at the tips of the twigs. At last, when there were no more buds and the birds seemed to have lost interest in the fresh young shoots, it was impossible for some days to see exactly what they were eating.

By now only one pair of birds remained, ultimately to nest. Presently I saw the cock—through a telescope at the closest range—tearing off and eating large blackthorn leaves. Sometimes the entire leaf was pulled off—when much was wasted—but more often a third or half of a leaf was torn off and eaten. At the same time I saw a cock House-Sparrow sitting close to the Bullfinch and eating blackthorn leaves in the same way. This was the only occasion on which the Sparrow was seen to eat leaves. Subsequently both the cock and the hen Bullfinch were seen eating them. In fact,

right up to the time when growing foliage precluded further observation, I never saw them eating anything else.

G. BERNARD GOOCH.

FLEDGING OF TITS IN N. CORNWALL.

THE following records of comparative dates of fledging of the Great Tit (*Parus major newtoni*), the Blue Tit (*Parus cæruleus obscurus*) and the Coal-Tit (*Parus ater britannicus*) may be of interest.

They show that the Coal-Tit has been consistently earlier than either the Great or the Blue. I have found that the Coal-Tit is almost as indifferent to human presence as the Goldcrest. This year I watched the nest at only five feet from the hole, the birds showing but little concern.

It would be interesting to know whether the above two points with the Coal-Tit are similar in other parts of Great Britain.

Dates of Fledging.

	1931	1932	1935	1936	1937	1938	1939	1940	1941	1942	1943
Great Tit ..	—	1/7*	8/6	16/6	9/6	31/5	5/6	—	4/6	9/7* 25/5†	3/6
Blue Tit ..	9/6	11/6	13/6	12/6	9/6	3/6	10/6	14/6	18/6	6/6	29/5†
„ „ ..	11/6	13/6	—	—	13/6	—	—	—	—	—	30/5
„ „ ..	—	16/6	—	—	—	—	—	—	—	—	5/6‡
Coal-Tit ..	—	—	—	4/6	—	22/5	30/5	27/5	—	—	27/5

* Second nest after failure of the first.

† The earliest I have ever recorded.

‡ One young—the only survivor of a brood of eight.

B. H. RYVES.

REED-WARBLERS BREEDING IN WEST SOMERSET.

ON June 27th, 1943, and again on July 4th, at a large reedy pool near Minehead, West Somerset, I watched a pair of Reed-Warblers (*Acrocephalus s. scirpaceus*) carrying food, and on the latter date several times watched one with full beak descend into the reeds in which the nest was evidently situated and return with beak empty. The pair was also seen, and the identification confirmed, by Mr. E. W. Hendy on July 2nd. I also located a second pair on the far side of the pool, and was fortunate enough to observe a fully fledged young one for some time at close quarters.

A. V. CORNISH.

[This appears to be the first proof of Reed-Warblers breeding in West Somerset.—EDS.]

DISPLAY FLIGHTS OF SPOTTED WOODPECKERS.

THE display flights of the two Spotted Woodpeckers are not often seen and have not been very fully described, so that the following observations may be usefully placed on record.

On May 3rd, 1942, I heard much "kik-kiking" from a pair of Great Spotted Woodpeckers (*Dryobates major anglicus*) and then the harsh "Mistle-Thrush" call. The pair were then seen flying towards a dead tree. The leading bird flapped its wings slightly slower than usual and continuously instead of with the usual

winnow and glide, so that it flew at one level instead of in the familiar undulating manner. There was a peculiar quivering about the primaries during this flight. The second bird followed a few yards behind flying normally. Both alighted close together on the trunk of the dead tree; then one or both slowly repeated a plaintive note. This sounded like the French word "coeur" rather drawn-out, and was in a high tenor pitch. After a short interval one (presumably the same) flew off in the opposite direction, again using the special flight. When it had alighted (outside my field of view) the second bird followed, flying normally. As I was unfortunately without glasses I could not distinguish the sexes.

Some years ago I observed a display flight of the Lesser Spotted Woodpecker (*D. minor comminutus*). Two birds were close together on a regular drumming place. After remaining motionless for some time one of them flew off using the special flight. It flapped its wings much slower than usual, and held them outstretched between each flap, so that, like the Great Spotted Woodpecker, it flew horizontally. The outstretched wings made it appear much larger than usual. When it alighted in the top of a tall elm its mate followed, flying normally. The whole performance was then repeated, after which both flew off normally in the direction of another drumming place. This was definitely a butterfly type of flight.

H. J. TOOBY.

COMMON HERON ALIGHTING ON WATER.

WHILE sitting on the shore of Loch Fad, Isle of Bute, on June 15th, 1943, I observed a Lesser Black-backed Gull (*Larus fuscus graellsii*) settle on the water in the middle of the loch and remain there a short time either eating something which had been floating on the water or vomiting something up, while a Common Heron (*Ardea c. cinerea*) was flying up the loch above the Gull.

When the Gull rose from the water the Heron at once wheeled round and alighted in the water in the exact spot where the Gull had been. After remaining in the water 3-5 seconds it rose with what seemed the greatest ease and flew away to a part of the shore which was out of my sight.

I was unable to see if it picked up anything from the water, but suppose it must have taken some food left by the Gull.

DAVID STUART.

BLACK-HEADED GULLS BREEDING IN NOTTINGHAMSHIRE.

THE following record of the Black-headed Gull (*Larus r. ridibundus*) breeding in Nottinghamshire in 1943 may be of interest, as there seems to be no other modern record for the county.

The notes are based on observations made by myself, Messrs. R. J. and T. Raines, R. Mann and R. G. Williams.

Black-headed Gulls are present in varying numbers at the sewage farm of the Nottingham Corporation, some miles east of Nottingham,

and between April and July there were between two and three hundred adults always present. Before and after this period there are invariably more.

Aggressive behaviour towards humans, and display amongst themselves was noted in April, the first nests with eggs being found early in May. In all about 80 nests were found, most of which contained from one to three eggs, and in some cases four.

Owing to various causes, natural and otherwise, not many of the birds retained their eggs for the full incubation period, but some small young were seen in the nests, and juveniles in various stages seen later, so it was evident that some successfully reared their young.

JACK STATON.

NUMBERS OF PINTAIL IN NOTTINGHAMSHIRE.—In connection with the exceptional numbers of Pintail (*Anus a. acuta*) previously reported in some districts (*antea*, p. 38) Mr. J. Staton informs us that a flock of 30-40 was repeatedly seen by himself and others in January and February on Nottingham Sewage Farm and a neighbouring large pool, and that a flock of 28 was also noted on February 27th by Mr. Williams on Moorgreen Reservoir, near Annesley, Notts.

BLACK TERNS IN FIFESHIRE.—Sub.-Lt. E. A. G. Duffey, R.N.V.R. informs us that he saw two Black Terns (*Chlidonias n. niger*), one of them with a small fish in its bill, by the sea at Crail, on June 23rd, 1943.

GREAT BLACK-BACKED GULL PLUNGING AFTER FISH.—Mr. D. H. Rankin reports that in March, 1943, at low tide in Belfast Lough he observed two Great Black-backed Gulls (*Larus marinus*) flying backwards and forwards over the shallow water close to mussel beds exposed by the tide. One of these was seen to plunge into the water after a momentary pause about 4 feet above the surface submerging almost to the wing tips. On another occasion one of the birds plunged but only submerged its head; after a second quick plunge it caught a fish about 6 inches long. Mr. J. E. Flynn in notes for the Addenda to the *Handbook* has already reported plunging from the air after fish by this species as frequently observed at sea, and we have now adequate evidence that such plunging, with complete or practically complete submergence, is employed on occasions by all the British breeding species of *Larus*.

LETTER.

THE RÔLE OF THE MALE IN RELATION TO INCUBATION

To the Editors of BRITISH BIRDS.

SIRS —It was with very great interest that I read the articles on incubation in the June and July numbers by Col. Ryves and Mr. Tucker. From reading these articles I realised that I must have had a quite unique experience regarding incubation by the male bird. Col. Ryves states: "If the male of species in which the female normally incubates alone is believed to be incubating on the rare occasions he is seen on the eggs one is forced to the

conclusion that Nature suddenly endows him with the powers of incubation only to deprive him of them as suddenly! Such a supposition surely is untenable?"

Mr Tucker in his final paragraph states: "It has been shown further that the evidence is strong, though falling short of absolute proof, that such males are probably incapable of providing the eggs with sufficient warmth for their development."

I think we may take it that the males of game birds very definitely come under Category 1 and never assist with the incubation of the eggs. Yet the following experience with Californian Quail (*Lophortyx californica*), the males of which, with the following exception, never in my experience (and I have bred large numbers) take anything to do with incubation, surely go to show that at a pinch the male can assume in spite of hormonal control—or the want of it—all the incubating functions of the female.

In the year 1930 I had a pair of Californian Quails in an aviary. Towards the end of May the hen started to lay, and by June 3rd she had laid seven eggs, when she suddenly died; I naturally concluded that the eggs would be lost, as male Californians never incubate, but, to my great astonishment, the male took on the job, sitting very hard. In fact I never saw him off the nest till on Sunday evening June 29th, I found him sitting on the ground all puffed out. I went up close, thinking he was ill, when out rushed seven Quail chicks; these chicks are so small that they can go through half-inch wire-netting.

Now that the male had carried out the incubation of the clutch I wondered would he continue the good work and bring up the chicks. This he faithfully did, developing two separate call notes, one the usual one which he used when he wanted to brood the chicks, but the other a much higher and sharper note when there was any fresh feeding about.

Here by all the rules of the game we have a case which should never have happened, especially as the game-bird species would be about the last for males to assume the functions of the female. I am sure readers would appreciate further views on the above by such well-known ornithologists as Col. Ryves and Mr. Tucker, both of whom we have to thank for their most thoughtful and intriguing articles. As Col. Ryves remarks, this subject still offers an almost inexhaustible field for patient study and research.

W. H. WORKMAN.

[This is certainly an interesting case, which emphasizes the need for further research, though in the absence of more complete information about the species in question it is difficult to draw any very definite conclusion from it. Speaking with all due caution, I cannot help wondering, having regard to the data discussed in my paper, whether the male Californian Quail may not prove to take a share in incubation more frequently than seems to be supposed. Mr. Workman is rather too sweeping in assuming that the males of game-birds "never assist with the incubation of the eggs." The males of some Quails definitely do so. For example, amongst North American species this is the case in the Bobwhite (*Colinus virginianus*) and in Mearns's Quail (*Cyrtonyx montezumæ mearnsi*). In the former a quite substantial proportion of nests appear to be in charge of the male exclusively, though a considerably larger number are in sole charge of the female, and it is well established that the male successfully takes over all the family duties if the female comes to grief. With regard to incubation of *Lophortyx californica* in a wild state, A. C. Bent in his *Life Histories of North American Gallinaceous Birds* was only able to quote one writer, to the effect (*italics mine*) that "usually the hen alone broods the eggs," which, though irritatingly vague, may be supposed to imply that the observer had at least some reason to think that males sometimes take some part. More field observation is obviously needed, but a relevant point which aviculturists should be able to settle is whether the male in the breeding-season has any brood-patches (*cf.* my paper, *antea*, pp. 22-28). The care of the young (as opposed to incubation) by the male does not raise any problem, as according to Bent both sexes normally share this duty.—B.W.T.]

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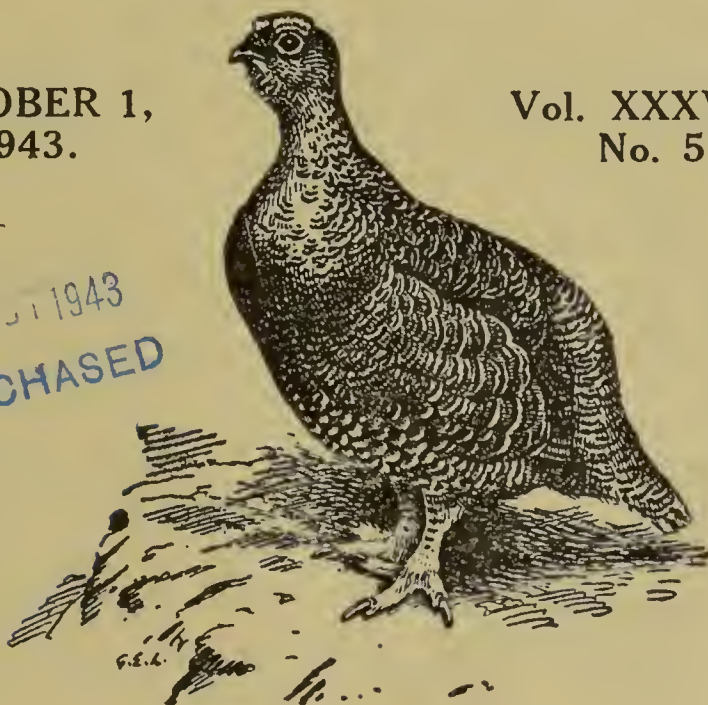
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SOME NOTES ON THE BREEDING OF A PAIR OF SPOTTED FLYCATCHERS

BY

LT.-COLONEL B. H. RYVES.

THE following notes on a breeding pair of Spotted Flycatchers (*Muscicapa s. striata*) combine examples of site-selection, retardation of laying, postponement of incubation, casual brooding by the female and egg-shell disposal. They also show that the species definitely belongs to Category 1 (species in which the females undertake incubation and the males may occasionally brood the eggs).

On May 15th, 1943, a male arrived in my garden, sang almost ceaselessly all the day and frequently inspected a hollow in an old pine five feet above the ground. This hollow held a nest of Spotted Flycatchers from 1935 to 1938 inclusive and in 1941, a successful Wren's nest.

On May 16th a female joined the male and both birds evinced great interest in the hollow. The former alone also inspected an alternative site some ten yards distant, but did not seem much excited about it.

On May 17th inspections of the hollow were continued by both birds, but on the 18th and 19th I saw neither of them anywhere in the garden. On the 20th I only saw and heard the male, but on the 21st the female reappeared and examined the hollow once more with her mate. After this date I saw nothing of the birds until the 26th, when excitement over the hollow was intense and this continued during the next three days.

On May 30th the female deposited a little lichen in the bottom of the hollow and on the 31st a few bits more. The weather at this point greatly deteriorated and the Flycatchers vanished completely.

On June 6th, the weather having much improved, the pair returned and the female resumed building in real earnest. On the 7th she completed the nest except for lining. On both these days, the male constantly inspected the progress of construction. On the 8th, a wet and foggy day, I think the female did no building, but on the 9th the nest was lined, two small feathers being added to it on the 10th.

The nest was very neat and the cup deep. It was composed solely of lichens and fine bark stripped off old pea-sticks. The lining consisted of very fine dead grasses and two feathers.

On June 12th at 11 a.m. (double summer time), I found the nest was still empty. At 11.25 a.m. the two birds appeared, the female at once settling in the nest and the male perching on a branch just above and in full view of his sitting mate. Here he remained motionless until the latter left. The female was extremely restless, gyrating and often appearing to stand on her head with her tail pointing skywards. For about a minute only, towards the end of her stay, did she sit quietly. At 11.43 a.m. she flew out and in company with

the male, disappeared for the rest of the day. During these 18 minutes she had laid her first egg.

On June 13th, at 11.30 a.m., I saw the male alight at the nest and peer down at the egg, while the female was hawking. At noon she settled down in the nest, performing all the same gyrations as on the previous day. At 12.10 p.m. the male fed her on the nest. At 12.30 p.m. she flew out and was again fed. The second egg had been laid. At 1 p.m. she returned and brooded her two eggs for about 30 minutes, after which I did not see her again for the day.

On June 14th I found the female brooding at 10 a.m., but at 10.20 a.m. she left her eggs. At 11.30 a.m. she returned and, with the usual familiar gyrations, laid her third egg. At 12.15 p.m. she was fed on the nest and then at once flew off with the male and did not show up again.

On June 15th the female was not observed on the nest until 12.15 p.m. when she settled down and, with the usual restlessness, laid her fourth egg. At 12.30 p.m. the male fed her and at 12.45 p.m. she flew into the pine and at once began catching flies. About two minutes later, the male alighted at the nest, but his mate brushed him aside and proceeded to brood for short spells. When she was off the eggs, the male frequently inspected them. She continued to brood off and on until 3.30 p.m. and then left the garden in company with the male. I paid a last visit to the nest at dusk and found the female was not sitting for the night.

On June 16th, at 10 a.m., the female was on her eggs, but she soon left and did not return to them till 11 a.m. She sat quite quietly and, after my previous experiences, I concluded that she was not laying a fifth egg. This proved to be correct, and her clutch consisted of four eggs. About 1 p.m. she ceased sitting and did not come to the nest again until 6.45 p.m. She sat very steadily and remained on her eggs for the night. I came to the conclusion that she had at last commenced incubation (namely at 6.45 p.m.).

A short account of the behaviour of the two birds during the period of incubation may be of interest :—

The *female* alone incubated. For the first few days of incubation, the duration of sitting shifts was 20-30 minutes, lengthening gradually to nearly an hour as hatching approached. Absences for feeding were short—7-11 minutes or often less. The longest absence recorded (at an early stage) was one of 25 minutes. When off her eggs, she hawked feverishly, sometimes near the nest but more often in the valley 100 yards below. At times, when she saw her mate catch a moth, she would dart off her eggs and snatch it from him.

The *male*. Throughout incubation, interest in the nest never waned. Every day, on several occasions, I saw him inspect the eggs while the female was feeding. This he did by alighting on the rim, bending down and apparently touching them with his beak. These inspections lasted for only a few seconds. Only once did I see him actually settle on the eggs for 10 seconds. When his mate was feeding some way off, he invariably guarded the nest and viciously

stooped at any bird that passed close by with the well-known resounding click of the mandibles. He fed his mate both on and off the nest at fairly frequent intervals, but in the main she fed herself. It was only during his mate's sitting shifts that he would leave the vicinity of the nest. When she came off her eggs during his absence, he would be back on guard from "nowhere" in remarkably quick time.

I might here remark that during the first day or two of incubation, whenever I inspected the nest, either of the birds which saw me would remonstrate by uttering a peculiar "growl" and not the usual "tzee-tzucc" described in *The Handbook* (Vol. i, p. 300). But they soon became so indifferent to my presence that I could examine the nest and eggs without evoking any note or sign of protest.

Eggs were hatched on June 29th as follows:—first egg between 3.30 and 4 p.m., second egg between 4.30 and 5 p.m., third egg about 6.30 p.m., fourth egg was not hatched up to 8 p.m., but I believe it hatched shortly afterwards, for early next morning there were four chicks all equally strong.

All through the period of the hatchings, the male constantly inspected the contents of the nest and frequently fed the female. I saw the latter feed the first chick at 4.25 p.m.

Disposal of egg-shells. As each chick fully emerged, the female removed the shell in two portions, carrying each separately to a nearby pine and then dropping it. Small fragments were nibbled and swallowed, none remaining in the nest. The male took no part in disposal.

Incubation Period. If I have correctly estimated the exact time incubation was commenced, the period for each egg was round about 13 days, but more than 14 days had elapsed since the laying of the last egg.

Unfortunately tragedy overtook the birds and further observation was cut short. On July 1st I paid my first visit to the nest at 10.15 a.m. and found that it was empty, but there was no evidence of interference of any kind and the cause of the disaster remains a mystery. The male was present and, while I was examining the nest, hovered round my head, uttering vigorous protests. As soon as I had stepped back a few paces, he alighted on the rim and probed into the nest. He remained on guard for ten minutes longer and then disappeared and I have never seen him since. The female I never saw at all.

To conclude, it may be worth recording that at another nest in a very sheltered position eggs were laid about 16 days earlier than in the nest described here, which was in a somewhat exposed situation.

OUTPUT OF SKY-LARK AND WILLOW-WARBLER SONG

BY

NOBLE ROLLIN.

In a footnote to material about Sky-Lark (*Alauda a. arvensis*) song (*antea*, Vol. xxxvi, p. 148) a comparison was made between the output of song per hour of a Sky-Lark and a Willow-Warbler (*Phylloscopus t. trochilus*). It may be of interest to have some more detailed comparisons of the hour to hour output of these two species, which are both well known as very persistent singers, and also as species which employ very different song methods and song lengths.

The Sky-Lark averages about 2.2 *minutes* per song, whilst the Willow-Warblers under observation averaged 3.3 *seconds*.

EXPLANATION OF GRAPHS.

An hour by hour graph of a Sky-Lark's whole output of song for a single day in April has already been given (*antea*, Vol. xxxvi, p. 148). Efforts of the same bird in mid-May and at the beginning of July are given in the accompanying Figure 1. There was a Willow-Warbler

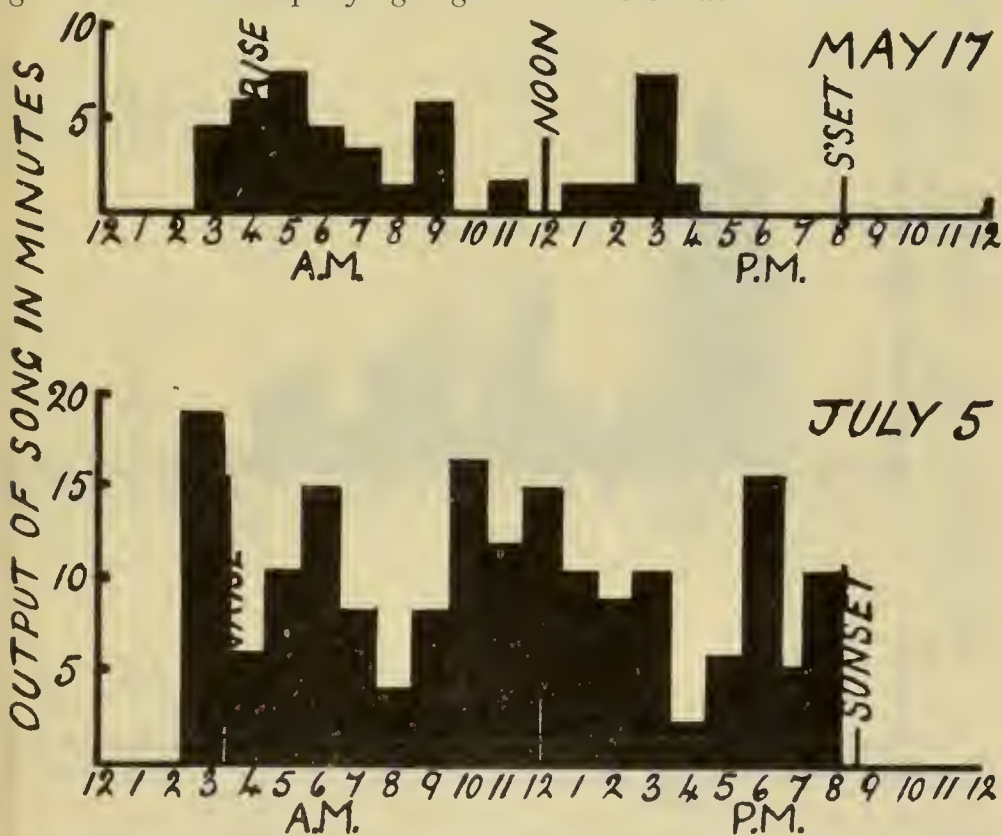


FIGURE 1.—SKY-LARK. Total Output of Song During the Day.

occupying a territory in some gardens a hundred and fifty yards or so from the Sky-Lark's territory and examples of the output of this bird are given in Figure 2 (May and July). These two territories were in the vicinity of Wallsend; Northumberland. Figure 2 (June) is the output of a Willow-Warbler in the Bird Station area at Glanton, Northumberland. All records were made in 1942.

Hour by Hour Output.

A Sky-Lark can sing continuously for an hour, whereas it is an inherent part of normal Willow-Warbler singing that there should be a pause between each short song. Because of this it is impossible for a Willow-Warbler to reach the maximum hourly output of the Sky-Lark. However, it is not what can be done, but what is done that counts, and in the birds actually timed it will be seen that the two species tied on a maximum output per hour of 19 minutes (Sky-Lark, July, "3 a.m." Willow-Warbler, June, "5 a.m.").

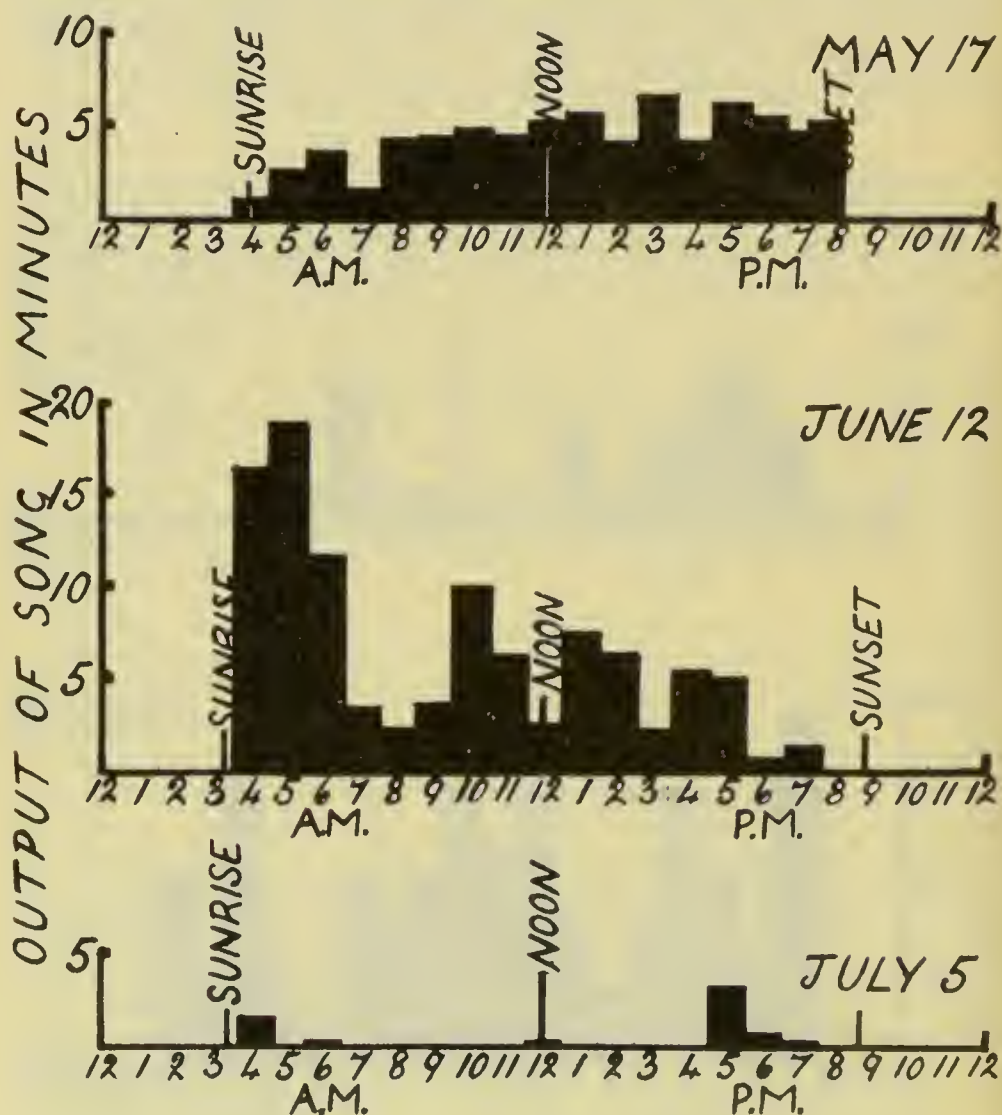


FIGURE 2.—WILLOW-WARBLER. Total Output of Song During the Day. The times are in Local Apparent Time, *i.e.*, time by sun at place of observation.

As to the variation in output during the day. If it be taken that the basic curve of bird song is one where there is a peak in the morning and another in the afternoon or evening, then the daily output graphs shown vary considerably from the basic pattern.

In the Sky-Lark Figure 1 (May) there is approximation to the basic pattern and in this and other respects it somewhat resembles the April record of the same bird. In Figure 1 (July), however, apart from the singing being more extensive, there is strong singing in the midday region, which alters the pattern altogether.

The only adherence in the Willow-Warbler to the basic plan is in Figure 2 (July), when the territorial singing season of this bird was about spent. Figure 2 (May) is a very definite pattern, but of quite a different kind. Contributed by the bird in full song, it starts slowly, rises gradually to an afternoon peak and then falls slightly again. The bird at Glanton, Figure 2 (June), also in full song, rather more than reversed this proceeding, starting abruptly and strongly in the early morning and then tailing away to nothing in the evening. It might be added that the weather during all the above observations was favourable to song throughout.

It will be noted that only in one instance (Sky-Lark, July) is the greatest output for the day in the first hour of singing.

OUTPUT TOTAL FOR THE DAY.

The total output for the day, together with the length of the singing day (measured from the first song in the morning to the last song in the evening), is given in the following table. The short May day of the Sky-Lark was due to an early close in the afternoon.

Date	Sky-Lark		Willow-Warbler	
	Singing Day	Output of Song	Singing Day	Output of Song
April 12	13 hrs. 20 mins.	69 mins.	—	—
May 17	13 hrs. 42 mins.	47 mins.	16 hrs. 42 mins.	75 mins.
June 12	—	—	16 hrs. 9 mins.	103 mins.
July 5	17 hrs. 55 mins.	181 mins.	15 hrs. 51 mins.	7 mins.

Whilst the average total daily output of the Sky-Lark in these particular records is greater than that of the Willow-Warbler, the difference is not by any means out of the ordinary. It is instructive to find that two (May and June) of the daily outputs of the Willow-Warbler are greater than two (April and May) of the Sky-Lark.

ANNUAL OUTPUT.

Some examples of the output of song on one day have been given. What, one might wonder, is the total output of a single bird for a year or season? For the Sky-Lark I have considerable material to work on and though variation is very great, the figure I have arrived at may be of interest. The mean output for one bird for a whole season is in the region of seven (24 hr.) days of continuous song.

NEST-SITE SELECTION BY BIRDS

BY

CAROLINE AND DESMOND NETHERSOLE-THOMPSON.

(Continued from page 74).

GREENFINCH (*Chloris ch. chloris*).

Female tests various positions, usually in presence of male. Short spells of brooding observed. Building may start almost immediately or not until a day or two later (D. N-T.). Similar behaviour noted. Building known to start within a few hours of selection of nest-site (C. V. Stoney). Pair seek nest-site in concert. Possible to tell site chosen before nest is started (J. H. Owen).

BRITISH GOLDFINCH (*Carduelis c. britannica*).

Both sexes together hunt for nest-site (G. L. Charteris). Nest-site selected after a concentrated brooding-spell by the female in chosen crotch. This noted fully a week before building commenced. Hen calls softly while brooding in empty crotch (A. Whitaker). Second nest by different female in one crotch in same year. This possibly due to male influence (C. J. Bellamy).

SISKIN (*Carduelis spinus*).

Female chooses nest-site, generally in presence of male, brooding and rotating for short spells only. A number of crotches carefully examined, and female may creep in and out of one or more of them again and again. In repeat nest-site selections, building may follow very shortly afterwards. In first nests selection may occur several days before commencement of building. During selection female is frequently very nervous and various substitute activities have been noted. (For published account cf. D.N-T. in *The Field*, Aug. 30th, 1941, p. 211).

LESSER REDPOLL (*Carduelis flammea cabaret*).

Female, in presence of male, seen trying various possible nesting-sites, and both together hunt for them.

BRITISH TWITE (*Carduelis flavirostris pipilans*).

Cock guards hen and sings nearby while she examines and inspects bunches of heather, etc. (C. V. Stoney). Both sexes together hunt for nest-site (G. L. Charteris).

LINNET (*Carduelis c. cannabina*).

Hen goes in and out of potential nesting-sites before deciding. Cock normally present (C. V. Stoney). Both birds seek nest-site in concert (G. L. Charteris and J. H. Owen).

BRITISH BULLFINCH (*Pyrrhula p. nesa*).

Nest-site sought by two birds together (J. H. Owen).

COMMON CROSSBILL (*Loxia c. curvirostra*).

Examination of various crotches by female usually in presence of male, may be followed almost immediately by building. Female also known to brood for long time in crotch eventually selected. This noted several days before foundations of nest were laid.

SCOTTISH CROSSBILL (*Loxia curvirostra scotica*).

Studied in detail by D.N-T. Nest-site normally chosen in course of a most distinctive selection-tour by both birds. Female tests and broods in various crotches. Substitute activities—bill-stropping, "false-feeding," preening, etc.—are common features. Male once seen to attempt to initiate nest by carrying twig and placing it in crotch, but female which sang softly while he was doing this, did not accept invitation. The nest-site is also sometimes selected by female after a protracted spell of brooding in chosen crotch. This may occur fully a week before building, but this is less usual than the method first described. On another occasion female flew over to singing male and invited coition. Male immediately "display-flighted" away from her, then returned and mounted her. Hen now visited and inspected various parts of different trees at short intervals. Selection may occur very shortly before building, but this is more pronounced in "repeat" nests.

BRITISH CHAFFINCH (*Fringilla cælebs gengleri*).

At first female may test, rotate, and brood in different crotches. Later may brood for spells of several minutes before final decision taken. Male usually, but not always present during the selection, which may occur several days before building, but site may also be chosen and nest begun within a few hours (C. and D.N-T.). Site chosen after inspection by female (C. V. Stoney). On March 6th female repeatedly hopped round hollow in tree. Nest begun two days later (D. Stubbert).

CORN-BUNTING (*Emberiza calandra*).

Hen, in presence of cock, drops into and examines a number of different possible nest-sites. This certainly sometimes precedes building by two clear days, but in repeat nests selection and building follow at very short intervals and this may also happen in genuine second-brood nests.

YELLOW BUNTING (*Emberiza c. citrinella*).

Female seen examining holes in ground and bank. Male not always present, but is generally not far away. In one case selection and building occurred on same day.

REED-BUNTING (*Emberiza s. schæniclus*).

Pair seen hunting marsh in mid-April, but female chooses actual nest-site in presence of male (C. V. Stoney).

SNOW-BUNTING (*Plectrophenax n. nivalis*).

Both sexes nervously flit in and out of hollows and crevices in scree, accompanied by much nervous pecking at lichen on part of female. Female, certainly appears to make final choice and building and selection may occur on same day. Several nests often begun by female before her choice hardens (C. and D.N-T.). Apparently similar behaviour recorded by N. Tinbergen (*Behaviour of Snow-Bunting in Spring*, 1939, pp. 25-31).

HOUSE-SPARROW (*Passer d. domesticus*).

Male in some cases appears to select possible nest-sites in advance of mating, but female known to reject this (C. and D.N-T.). Male probably chooses nest-site (D. W. Musselwhite). Male selected nesting-hole several days before arrival of female, but this proved to be too small for the latter to enter although she and male defended it against a pair of Blue Tits. Following a spell of severe weather, the birds disappeared, but nearly a month later male appeared alone (C. E. Martin, *Brit. B.*, Vol. xxxiii, p. 108).

TREE-SPARROW (*Passer m. montanus*).

Male took up territory in beginning of February. On February 10th, apparent reversed coition noted and on March 3rd both birds emerged from hole in which nest was built and eggs laid in early May (G. L. Charteris).

WOOD-LARK (*Lullula a. arborea*).

Both sexes participate in nest-site selection, but female, which scratches out hollow, rotates, broods, etc., apparently has final choice. Nest-site may be chosen and building begun on same day. These notes founded on "repeat" nests.

SKY-LARK (*Alauda a. arvensis*).

Female examines and broods nest-hollows, and later makes a scrape or scrapes. Male not seen to participate, but he is usually in vicinity.

TREE-PIBIT (*Anthus t. trivialis*).

Female drops time after time into selected patch during final phase of selection. In one case this was seen during early morning and building began the following day (D.N-T.). Male may remain well away from female while she forms scrape and chooses nest-site (C. V. Stoney).

MEADOW-PIBIT (*Anthus pratensis*).

Female seen examining possible nest-places some days before she began to build, but site-selection and building may occur on same day.

ROCK-PIBIT (*Anthus spinoletta petrosus*).

Female flits in and out of crevices and examines different positions (C. V. Stoney).

YELLOW WAGTAIL (*Motacilla flava flavissima*).

Female, sometimes chased by male, seen repeatedly dropping into tussock, each flight being commenced from a telegraph wire. This tussock was

eventually chosen, but building was not commenced until several days later (C. V. Stoney).

GREY WAGTAIL (*Motacilla c. cinerea*).

Hen, in presence of cock, makes thorough exploration going in and out of various holes, etc. This may occur several days before building (J. H. Owen and D.N-T.).

PIED WAGTAIL (*Motacilla alba yarrellii*).

Female, in presence of male, enters and examines various holes in walls, sheds, etc. Cock also seen examining possible nest-sites, but his influence is apparently indecisive. Site-selection generally occurs several days before building (C. and D.N-T.). Male's "suggestions" thoroughly tested by female, but if female "suggests" a nest-site to male, he rarely tests it. When nest-site is finally selected birds go right away and may not begin to build until several days later (J. H. Owen). Pair seen to arrive in old territory and after the male had flown away, the female thoroughly explored every hole and crevice *except* the nest-site occupied in previous seasons which was tenanted by another species. This suggested that she had previously explored or watched that site (A. Whitaker). In one case male selected and built in one site, female in another, but female's site was continued (*Brit. B.*, Vol. xxvi, p. 162), but in following year the nest was built in the site in which the male had begun to build (J. S. Elliott, *Brit. B.*, xxvii, p. 48).

BRITISH TREE-CREEPER (*Certhia familiaris britannica*).

Both sexes in turn examine possible nesting-sites (N. Tracy). Single bird fluttered in and out of shed in which the nest was eventually built. This happened a day or two before building began (D. Stubbert). Both sexes for several days test various possibilities (W. M. Ross, *Brit. B.*, Vol. xxxvi, p. 110). Two broods sometimes reared in same nest (D.N-T. *et al.*).

BRITISH NUTHATCH (*Sitta europæa affinis*).

Both sexes examine possible nesting-holes long before building (D.N-T.). Birds visited nesting-hole on March 14th, both inspecting entrance, hen going in fairly frequently, cock singing nearby. "Symbolic" building began on March 18th. Building still in progress on April 11th (L. S. V. Venables, *Brit. B.*, Vol. xxxii, pp. 26-29). Both sexes examine possible nesting-premises when new site is sought (N. Tracy and J. H. Owen). Pair inspected hole of former year on March 1st; four days later, one in hole and other outside. Young in nest on May 11th (C. Doncaster and M. Dunsheath, *Brit. B.*, Vol. xxxii, pp. 136-7).

BRITISH GREAT TIT (*Parus major newtoni*).

Both sexes together examine possible nest-sites. The period at which site-selection occurs is variable. Examination may occur long before building or only shortly before it (D.N-T.). In new pairing cock may prospect and "suggest" several possible nest-sites, one of which is chosen by hen (G. Dent). Pair once selected and began to build in a box the day after it was put up. Two broods occasionally reared in same nest (D. W. Musselwhite).

BRITISH BLUE-TIT (*Parus cæruleus obscurus*).

Both sexes prospect possible nest-sites well in advance of building (D.N-T.). Pair may inspect hole in box from January onwards, but final selection may be deferred until shortly before nest-making (D. W. Musselwhite). Male may "suggest" several different sites, one of which is generally chosen by female (G. Dent). Cock and hen inspected Nuthatch's hole, clinging to entrance, and even going inside, but this did not occur after Nuthatches had begun plastering (L. S. V. Venables, *Brit. B.*, Vol xxxii, p.26). Two broods reared in same nest (R. Ware). Pair prospected three holes before beginning to build. After carrying material into one hole birds appeared dissatisfied, but after further exploration, they again built in original site (J. H. Owen).

BRITISH COAL-TIT (*Parus ater britannicus*).

Both sexes examine possible nest-sites. When a hole in the ground is chosen, selection may be made only a few days before nest-building (first nest). For repeat nests, site may be chosen on day on which building begins (D.N-T.). In July noisy pair perched beside hole in tree which contained no nesting material whatever. On being disturbed birds departed, but

later male, subsequently followed by female, returned and sang vigorously while perched on edge of hole. No nest, however, was built, although the urge to select a new nest-site even at this late date was still strong (D. W. Musselwhite and R. Ware). Pair seek nest-site in concert (J. H. Owen).

SCOTTISH CRESTED TIT (*Parus cristatus scoticus*).

Both sexes together examine possible nesting-premises, in some cases, but not invariably, some days in advance of building and excavation. Special cries employed on selection tours. Pair sometimes return to site inspected earlier. Female probably has dominating influence and she alone excavates. Trial boring a feature of selection, as site may be deserted if the wood is too hard. (For published reference cf., C. and D.N.T. in *The Field*, May 24th, 1941, p. 655).

BRITISH MARSH-TIT (*Parus palustris dresseri*).

Both birds together seek nesting-site (J. H. Owen). In *Parus p. palustris* selection is by pair, female taking lead (O. Steinfatt, *Beitr. Fortpfl.-biol. Vög.*, 1938, pp. 84-9).

BRITISH WILLOW-TIT (*Parus atricapillus kleinschmidti*).

Both sexes, female employing special creaky calls, examine and work at various holes, etc. (D. W. Musselwhite and R. Ware).

BRITISH LONG-TAILED TIT (*Parus caudatus rosaceus*).

Selection apparently occurs some time before building begins. In one case despite disturbance, female remained faithful to selected nest-site and she alone laid foundations of nest (J. Markham).

RED-BACKED SHRIKE (*Lanius c. collurio*).

Male appears to influence choice of nesting-site and selects territory (D.N.T.). Some days before building began cock seen repeatedly entering and leaving part of bush in which nest was eventually built (D. W. Musselwhite). Pair may seek nest-site in concert, but in two cases male and female started nests independently although those made by the two females were eventually used (J. H. Owen).

SPOTTED FLYCATCHER (*Muscicapa s. striata*).

Both sexes participate in nest-site selection and examine alternative nesting-premises some days before beginning to build (J. H. Owen and N. Tracy). Cock selected site and built second nest while first brood in nest (H. Ecke, *Orn. Monatsber.* xlv, pp. 40-2).

PIED FLYCATCHER (*Muscicapa h. hypoleuca*).

Cock known to select nest-hole prior to arrival of hen (D.N.T.). Detailed account of manner in which male selects nest-hole (cf. H. A. Gilbert, *Brit. B.*, xxii, p. 189). Male may suggest nest-hole to female, but she may select another (N. Tracy). Cock begins *building* before hen arrives (M. Portal, *Wild Life*, iv).

BRITISH GOLDCREST (*Regulus r. anglorum*).

Hen, in presence of cock, seen to creep along branch, rotate in and inspect various positions. Building began next morning (D.N.T.). Pair seen to look over partly-built nest (previously deserted) and start rebuilding it for second brood (J. H. Owen).

WILLOW-WARBLER (*Phylloscopus t. trochilus*).

Male definitely examines possible nest-sites prior to arrival of female. In one case hole examined by male was selected by female.

WOOD-WARBLER (*Phylloscopus sibilatrix*).

Hen, in presence of cock, which escorted her and sang from a perch nearby, dropped into various places and explored them. Building commenced later in day (repeat nest) (D.N.T.). Hen eagerly inspected site beside male's singing-post, and another 80 yards away from it and latter selected (E. Giles, *Ool. Record*, xiv, p. 60).

GRASSHOPPER-WARBLER (*Locustella n. naevia*).

Female chooses nest-site (J. Vincent). Male selects territory; both birds take part in site-selection, but female's influence probably decisive (D.N.T.).

REED-WARBLER (*Acrocephalus s. scirpaceus*).

Male evidently influences choice of "core-territory" as one particular male occupied same area five years in succession and in 1914-15 nest found in same restricted reed-patch (E. L. Turner, *Broadland Birds*, pp. 65-66). Site selected some time before building begins (J. Markham).

MARSH-WARBLER (*Acrocephalus palustris*).

Both sexes together select nest-site after spending some little time over several spots before deciding, and building sometimes starts in evening (J. W.-Bond, *Brit. B.*, xxvii, p. 59).

SEDGE-WARBLER (*Acrocephalus schænobænus*).

Female almost invariably chooses nest-site (J. Vincent).

GARDEN-WARBLER (*Sylvia borin*).

In some cases male appears to exert considerable influence on choice of nest-site *e.g.* when "cock nest" lined and used.

BLACKCAP (*Sylvia a. atricapilla*).

Male has first say in choosing nest-site, but female gives final approval after nest started (J. H. Owen).

WHITETHROAT (*Sylvia c. communis*).

Cock before arrival of hen builds up to 3 nests. When hen accepts one of cock's nests she removes decorations (J. P. Burkitt, *Irish Naturalist*, 18, pp. 140-144). Male builds "cock nests" before arrival of female, one of which latter may select. At other times female chooses another site and both then help to build nest (*Handbook*, ii, p. 84, based on observations of H. E. Howard *et al.*).

LESSER WHITETHROAT (*Sylvia c. curruca*).

Site selected and nest built by male, female finishing and lining (H. E. Howard, *The British Warblers*). Same site chosen two years in succession possibly by same male, although two females were involved (C. V. Stoney). In some cases male selects nest-site and largely builds nest which female finishes (H. E. Forrest, *Brit. B.*, xxi, p. 151 and G. L. Charteris).

DARTFORD WARBLER (*Sylvia undata dartfordiensis*).

"Cock nests" not infrequently lined and used by female, particularly in second or "repeat" nests (C. J. Bellamy).

MISTLE-THRUSH (*Turdus v. viscivorus*).

Methods variable. Female may brood selected crotch for long spells up to a fortnight before building begins (D.N-T.). On February 18th, female interested herself in hollow formed by three branches on sycamore tree; around this she continued to travel for over five minutes. Building started *c.* March 6th (J. S. Taylor, *Brit. B.*, xxxi, pp. 233-4). The exact site of nest only selected by female a day or two in advance of building (B. H. Ryves, *Brit. B.*, xxii, p. 31). Same nest used after eggs removed (C. V. Stoney, *Brit. B.*, xxii, p. 161). Nest rebuilt in exact crotch from which earlier nest had been removed (W. M. Congreve, *Brit. B.*, xxvi, p. 23). Both sexes may explore possible nest-sites. In one case female examined several trees beginning with lowest fork or crotch and working upwards. Each site carefully examined, bird hopping round and inspecting from different angles and usually rotating in fork before passing on. In crotch finally chosen bird investigated as above, then hopped into hollow, and slowly settled down into brooding position in which it remained for nearly 30 minutes. Brooding in same crotch also noted thirteen days later and again on fourteenth day, but building not commenced until twenty-first day from original first exploration (A. Whitaker).

BRITISH SONG-THRUSH (*Turdus e. ericetorum*).

Female seen testing crotch over a week before building began (D.N-T.). On death of male, female deserted and nest removed, but she later re-mated and built second nest on exactly the same site (H. E. Forrest, *Brit. B.*, Vol. xxix, p. 115). Three successive broods reared in same nest (C. E. Alford, *Brit. B.*, pp. 86-7).

RING-OUZEL (*Turdus t. torquatus*).

Cock, in presence of hen, seen flying down to examine various possible sites on heathery bank (D.N-T.). Exceptionally two broods reared in same nest. Nest of previous year once relined and utilised (J. Armitage, *Brit. B.*, Vol. xxxvi, p. 37).

BLACKBIRD (*Turdus m. merula*).

Methods evidently variable. In some cases female alone decides some days before building begins. Testing noted (D.N-T.). Cock chose nest-site (H. Gaythorpe, *Zool.*, 1902, p. 200). Both sexes share in nest-site selection (V. Van Someren, *Scott. Nat.*, 1933, p. 78). Female made and used nest in 1926, relined it in 1927, and built on higher branch of same tree in 1928 (B. H. Ryves, *Brit. B.*, Vol. xxii, pp. 87-88). More than one brood sometimes reared in same nest (C. J. Bellamy). After male had displayed to female, latter made site-selection tour, hopping along coping and fluttering into small crevices on face of wall. In one crevice she remained half a minute (several days before building). Another female brooded more than a minute in cavity in which Robins were building (A. Whitaker).

WHEATEAR (*Enanthe æ. ænanthe*).

Both sexes examine nesting-holes, but female's influence probably decisive. Male seen to enter rabbit-hole on the very day that female arrived, and it is possible that he did so previously (C. and D.N-T.). Male enters and inspects nest-holes before arrival of female, later both sexes together do so (C. V. Stoney).

WHINCHAT (*Saxicola rubetra*).

Female watched repeatedly dropping into and rising from nest-site eventually chosen, cock present but he did not actually inspect site. Building in full swing three days later (one record).

BRITISH STONECHAT (*Saxicola torquata hibernans*).

Hen, in presence of cock, seen examining possible nest-sites a couple of days before building began (one record). In repeat nests, selection and building may occur on same day.

REDSTART (*Phænicurus ph. phænicurus*).

Cock may select site and incidentally spar with hole-competitors prior to mating, but female does not always accept his choice (D.N-T.). Male known to examine various nest-holes without actually entering prior to arrival of female. To these he takes her and from them she makes her final selection (G. Dent). Both birds visit various boxes, etc. as if uncertain which to choose (N. Tracy). A few days before building female repeatedly entered and left nest-hole in which nest was eventually built (D. Stubbett).

NIGHTINGALE (*Luscinia m. megarhyncha*).

Cock selected nest-site (R. Morris, *Zool.*, 1914, p. 149).

BRITISH ROBIN (*Erithacus rubecula melophilus*).

Female alone appears to select nest-site, visiting, testing and exploring various holes in bank, etc. (D. Lack and D.N-T.). Both sexes flew in and out of hole without carrying in material, but removing remains of old nest. This inspection was continued after cavity had been cleared. In another case a pair flew in and out of hole in wall some nine days before they commenced to build in it (A. Whitaker).

BRITISH HEDGE-SPARROW (*Prunella modularis occidentalis*).

Female seen examining nest-sites some days before building began, male also present.

WREN (*Troglodytes t. troglodytes*).

In many cases male appears to have strong influence on site-selection as female lines "cock-nest." This is not, however, the invariable procedure.

BRITISH DIPPER (*Cinclus c. gularis*).

Over a week before building began female originally escorted by male, which fed her before flying away, inspected old nests. Brooding also a feature of selection if new site chosen. In one case female also alone laid foundations of nest, although assisted by male at later stage (D.N-T.). Six clutches taken from one nest during one season (A. Brook, *Brit. B.*, Vol. v, p. 296). In some cases same nest occupied year after year (J. H. Owen).

SWALLOW (*Hirundo r. rustica*).

Male may choose possible nest-site prior to arrival of female, but she does not always accept his choice (D.N-T). Male may make incomplete nest while female is sitting (H. E. Forrest, *Brit. B.*, Vol. xxi, p. 151). A number of preliminary nests may be prepared one of which may be employed for second brood (J. H. Owen).

HOUSE-MARTIN (*Delichon u. urbica*).

In one case male attempted to destroy nest female was building, but female persevered and nest was eventually completed (W. M. Ross).

SAND-MARTIN (*Riparia r. riparia*).

Both sexes fly in and out of various possible nesting-holes (D.N-T.). Both sexes participate in site-selection (L.K. Beyer, *Wilson Bull*, Vol. i, pp. 122-137).

SWIFT (*Apus a. apus*).

Exact method and share of sexes not ascertained, but pair seen flying in and out of various potential nesting-holes under thatch prior to nest-building phase.

NIGHTJAR (*Caprimulgus e. europæus*).

Both sexes appear to squat close together during site-selection phase (D.N-T.). Female alone formed scrape (O. Heinroth).

KINGFISHER (*Alcedo atthis ipsida*).

Single bird (sex ?) seen flying along bank going in and out of various holes (C. V. Stoney).

GREEN WOODPECKER (*Picus viridis pluvius*).

Male chose nest-site and bored most of hole, then female came in and cleared out chips (J. H. Garrett).

BRITISH GREAT SPOTTED WOODPECKER (*Dryobates major anglicus*).

In one case cock initiated selection and alone began boring (D.N-T.). Cock selected site (G. Vernon, *The Field*, 25th August, 1939). Apparently in some cases by male (N. Tracy). In *Dryobates m. major* by male in some cases (O. Steinfatt).

BRITISH LESSER SPOTTED WOODPECKER (*Dryobates minor comminutus*).

Both sexes have site-selection impulse, probably male in particular influences choice, but in one instance male and female made separate borings, male occasionally collaborating with female. Finally neither nest used (N. Tracy).

WRYNECK (*Jynx t. torquilla*).

Single bird (male ?) present in nesting-tree before mating. Both birds watched examining ancient nest-hole some days before laying.

CUCKOO (*Cuculus c. canorus*).

Nest of fosterer is selected and ovulation apparently takes place during concentrated watch on building-operations of propective dupes (E. Chance, *Cuckoo's Secret*, 1922).

LITTLE OWL (*Athene noctua vidalii*).

Female selected nest-site and made depression (T. Gunn, *Zool.*, 1880, p. 474).

LONG-EARED OWL (*Asio o. otus*).

In early February, in evening, female broods on nest during process of site-selection. Female answers male when he hoots to her and finally flies away to join him. This may occur fully four weeks before laying (C. V. Stoney).

SHORT-EARED OWL (*Asio f. flammeus*).

Female chooses nest-site (J. Vincent).

BRITISH TAWNY OWL (*Strix aluco sylvatica*).

After destruction of female, a new mate was brought to nest-site by male (J. Markham). During site-selection phase in March there was much calling round a nesting-box and a few days before laying one of the birds roosted in it. In succeeding years when this box was re-occupied, the birds returned to it without noise or demonstration (A. Whitaker).

(To be continued).

NOTES.

CHAFFINCHES BUILDING NEW NEST FROM
MATERIAL OF PREVIOUS ONE.

LORD GREY in *The Charm of Birds* mentions the fact that Chaffinches (*Fringilla cælebs gengleri*) move their nests. I can find no reference to this habit in *The Handbook* or any of the usual text-books and I wonder if it is realized what a common practice this is.

I have had, under fairly close observation, seven nests in 1942 and eight in 1943. Of the seven nests in 1942, three were taken down and rebuilt for second nests. In 1943 three were removed before occupation and rebuilt in a different position and three removed for second nests.

In no case was a second nest built without using most of the material from the first. On several occasions the birds were watched carrying out the task of removal and the new nests were found by following the line of flight. The method is as follows :—ten days or a fortnight after the first brood has flown the nest will be pulled out and found at the foot of the tree or bush in which it was situated. I have not seen the actual pulling out, but have no doubt it is carried out by the birds themselves. The hen bird, with the cock fussing round, then collects the material from the ground and flies off to the new site, the cock still accompanying her, but appearing to do no work himself. The old and new nests have been placed from three to five yards apart.

E. A. DE HAMEL.

ENTRANCE TO NUTHATCH'S NESTING-HOLE
ENLARGED AND NO MUD USED.

IN view of the statement in *The Handbook* under the Nuthatch (*Sitta europæa britannica*) that the entrance to the nesting-hole is always reduced in size by mud, the following details of a nest found by me this year near Leyburn, Yorkshire seem worth putting on record. It was in an oak tree at a spot about eight feet from the ground where many years ago a large branch had been sawn off. The scar had been gradually covered over by incurving woody growth till but a tiny hole remained in the centre. A pair of Nuthatches had decided on this hole for a nesting-site, but found it was too small for them, so they very neatly chipped away the green bark ringing the hole, doing this evenly all the way round till the hole was just large enough for them to get inside, and here they successfully reared their family. A careful examination was made, but not a trace of mud or filling of any kind could be found; the adaptation of the entrance had been entirely by enlarging. All the work was but newly done and the nest was found whilst it was being built. There was no evidence to suggest that the site had been confiscated.

J. P. UTLEY.

WHITETHROAT NESTING IN GRAIN.

ONLY very rarely does one hear of a nest built in growing grain. In July, 1940, a pair of Whitethroats (*Sylvia c. communis*) built a nest in a tuft of common tares growing in a field of oats near Whittington, Shropshire. The nest was some thirty inches from the ground, and seemed to be in a most insecure position. In spite of this the eggs were hatched and the nest had not even tilted when some animal ate the young in the nest leaving only the wing quills. The young then were approximately seven days old. This nest was about thirty yards from the nearest fence. J. H. OWEN.

COURTSHIP OF GREEN WOODPECKER AND PECULIAR BEHAVIOUR OF ADULT AND YOUNG.

IN the third week of April, I twice witnessed coition of a pair of Green Woodpeckers (*Picus viridis pluvius*) on the ground about 20 feet from my window at Boars Hill, near Oxford.

The male arrived first, followed within a few minutes by the female. For a short time each was busy feeding, taking no notice of the other. Then the female stood quite still for several seconds, the male approached her and put or pretended to put something in her beak, immediately afterwards mounting her back, seizing the feathers on the top of her head, flapping his wings, and remaining in coitus quite a minute, the female remaining motionless. The birds then flew off together towards the nesting place. On the second occasion the birds alighted at the same spot and the male again fed or appeared to feed the female, but they flew to more open ground for coition, possibly having noticed the watchers at the window as we deliberately moved slowly to see what would happen.

On August 11th I observed the following curious incident between an adult and a young bird, which was quite unmistakably identified as such. Hearing what I took to be a young woodpecker in distress, I went towards the sound, but an adult bird reached the spot first, yaffling loudly. It alighted under an apple tree opposite and within a foot of the young bird, and for a minute or more they stood face to face turning their heads rhythmically first to right and then to left at about the speed of the tick of a grandfather clock, the beaks being horizontal and parallel; after a while the young bird got out of time, but was corrected by the adult and the "drill" or dance or whatever it was was repeated many times. Between the swings to right and left one of the birds—by the voice I think the young one—emitted a single note rather like the "pay-pay." Then suddenly the movement ceased and the adult put or went through the action of putting something in the young one's beak, quite rhythmically and at the same rate as before, each seeming to bow slightly to the other, as they had not moved their feet and were a little too far apart to do this easily; the movements were again repeated many times. Finally the adult sprang on the young one's back, but it overbalanced and they both fell in a heap. At

this moment the young bird, which was facing me, probably noticed a movement on my part (I had gradually approached closer and closer) and flew off to a tree. It was unfortunate that this incident could not be followed to an undisturbed conclusion, but the way in which what appeared to be an attempt at coition followed on behaviour closely resembling that preceding the normal sex act as described above is noteworthy. WINIFREDE M. FISH.

YOUNG OF GREAT SPOTTED WOODPECKER FED ON NESTLING BIRD.

ON June 6th, 1943, at Dodderhill Common, near Hanbury, Worcs., during observations at a nesting hole of a pair of Great Spotted Woodpeckers (*Dryobates major anglicus*), containing almost full-grown young, the male parent was observed to arrive with a large object which it attempted to tear to pieces on a branch near the nest. This gave time for the object to be clearly identified with high power prismatic glasses as the body of a very young nestling bird. The legs and bits of down could just be made out, but the head had been removed.

Failing to pull the body to pieces, the bird took the whole mass to the nest and offered it to one of the young at the hole, where a tug-of-war ensued, both birds using all their strength to pull the victim to pieces. As they were unable to do this, the parent again carried off the body to the branch and renewed its attempts to tear it into smaller pieces, holding it down with its feet and tugging at it with the bill. Again failing, it again offered the whole body to one of the young, with the same result, and it was only at the third attempt that it succeeded in tearing it into two parts, the stringy intestines of the nestling being distinctly seen in the process. One portion was then offered to the young and accepted. The parent bird did not retrieve the remaining part, but the branch was too high and inaccessible to reach.

Great Spotted Woodpeckers have been recorded taking young birds from nests (*cf. Handbook of British Birds*, Vol. 2, p. 286), but the feeding of the young on such material does not appear to have been observed before. J. W. HODGETTS.

[O. Schnurre (*Beitr. Fortpfl.-biol. Vög.*, 1936, p. 232) cites more than a dozen recorded cases of this species killing young birds, but only one of these, an old record from Brehm's *Tierleben*, of one shot in the act of carrying a young tit to its own young, seems to be at all parallel with the present case.—B.W.T.].

MARSH-HARRIER IN NORTHAMPTONSHIRE.

ON September 4th, 1943, in company with Miss K. Price and Mr. G. H. Spray, I watched a Marsh-Harrier (*Circus æ. æruginosus*) at Northampton Sewage Farm. It was an immature bird in the dark chocolaty-brown plumage with yellow crown. The last record of a Marsh-Harrier in Northamptonshire appears to be that of a bird seen by Lord Lilford between 1860 and 1865 (*Notes on the Birds of Northamptonshire and neighbourhood*, 1895).

B. W. TUCKER.

KITE IN SHROPSHIRE.

WHEN about three miles from Bridgenorth on my way to Wolverhampton in the evening of August 9th, 1943 I saw in the distance a large hawk. By the time I had got out my binoculars (12x) the bird was some 80 yards away and I could only see that its upper-parts were reddish-brown. Luckily a Carrion-Crow attacked it and it turned and flew back and I had an excellent view of its reddish-brown forked tail clearly identifying it as a Kite (*Milvus m. milvus*).

W. F. IRELAND.

GANNETS AND MANX SHEARWATERS NESTING
ON GREAT SALTEE, CO. WEXFORD.

WE stayed on Great Saltee from May 14th to 24th, 1943 and among other birds found two pairs of Gannets (*Sula bassana*). There was one nest with an egg, but the egg disappeared during our stay and was probably taken by a gull.

Although the weather was not very favourable and we were unable to obtain any estimate of the number of Manx Shearwaters (*Puffinus p. puffinus*) we were fortunate enough to get definite proof of breeding, as in two burrows excavated we found a bird and egg present in each, while in a third there was a bird but no egg.

JOHN WEAVING, JOHN BARLEE.

FULMARS IN SUMMER IN DORSET.

ON May 12th, 1943, two Fulmar Petrels (*Fulmarus g. glacialis*) were seen flying up and down a stretch of the Dorset coast and occasionally visiting a third which sat on a ledge near the top of the cliffs. On June 8th and 24th a single bird was seen in exactly the same place and it is possible that a second bird was present on both these occasions, for the bird which I was watching alighted on a part of the cliff-face that it was impossible to inspect.

G. BERNARD GOOCH.

[This appears to be the first evidence of the presence of Fulmars on the south coast of England in summer, though it does not give proof of breeding.—EDS.]

BREEDING OF FULMARS IN FIFE.

IN 1942 Thomas Dow found six pairs of Fulmars (*Fulmarus g. glacialis*) breeding on a rocky outcrop between Buckhaven and East Wemyss. Unfortunately, though the eggs hatched, the young birds were taken. He informed us of his find and we visited the site in 1943, but though the birds were about no eggs were seen. We found that they had been frequenting another cliff just west of West Wemyss, but they do not appear to have bred there yet. This spring Oliver and Carl Reingold told us that Fulmars were colonising the cliffs below the Scores at St. Andrews and we found that six to eight pairs had taken up their stations on the ledges there and were courting hard. We could not see if there were eggs. This is

practically in the town of St. Andrews as the gardens of the Scores run right down to the cliff edge.

Credit is due to these young naturalists for having recognised the Fulmars and we are grateful to them for having told us about these new colonies.

EVELYN V. BAXTER AND LEONORA JEFFREY RINTOUL.

MOORHENS' UNUSUAL NESTING-SITE AND NEST MATERIALS.

DURING a brief visit which I paid to Lady Isle in the Firth of Clyde on May 31st, 1943 I was surprised to find Moorhens (*Gallinula ch. chloropus*) breeding on the islet which lies three miles off Troon, the nearest land, has no visible fresh water and is about four acres in extent. The central part of the island is covered with coarse grass and there are two small clumps of flag iris, the perimeter of the island is a mass of boulders devoid of vegetation. Both Moorhens' nests found were amongst these boulders and each was placed well under the overhang, one contained seven eggs and the other had hatched. The nests were built almost entirely of the discarded primary feathers of gulls. Whether the Moorhens are resident on, or summer migrants to, this barren spot it would be interesting to know. The highest part of the island cannot be more than 20 feet above high water mark and in winter gales the whole of it is drenched in spray.

G. HUGHES ONSLOW.

HOUSE-SPARROW ATTACKING STRIPED HAWKMOTH IN ISLE OF MAN.—Mr. W. S. Cowin writes that on June 6th, 1943, Mr. G. J. H. Neely of Onchan, noticed a disturbance on his lawn and went out to find a House-Sparrow (*Passer d. domesticus*) attacking a large Striped Hawkmoth (*Celerio livornica*) measuring three and a quarter inches across the wings. The moth was vigorously beating its wings, but when the bird was driven off made no attempt to fly away. Mr. Cowin informs us that this is the first Striped Hawkmoth to be recorded from the Isle of Man for forty-four years.

EARLY NESTING OF SUMMER MIGRANTS IN 1943.—Among records sent to us by correspondents additional to those published (*antea*, p. 59), the following seem worthy of note.

TREE-PIBIT (*Anthus t. trivialis*).—Mr. A. W. Bolt found two nests near Hereford on May 16th containing young—one brood just hatching out, the other about three or four days old.

WOOD-WARBLER (*Phylloscopus sibilatrix*).—Between May 18th and 23rd Mr. A. W. Bolt found eleven nests in the Hereford district all with young, from a day or two to five or six days old.

GRASSHOPPER-WARBLER (*Locustella n. naevia*).—A nest found by a member of Blundell's School Natural History Society, near Tiverton, Devon, on May 16th and reported by Mr. R. A. W. Reynolds, contained three young and one egg, which hatched later the same day. The first egg must therefore have been laid before the end of April.

DISPLAY OF KINGFISHER.—Mr. P. S. Burns informs us that while watching a pair of Kingfishers (*Alcedo atthis ispida*) at their nesting-hole in April he saw the male, after feeding the female, proceed from

his perch in a low, circular flight before her, dipping himself lightly into the surface of the water every few feet and calling excitedly. This behaviour varies somewhat from displays previously described.

UNRECORDED HERONRY IN ESSEX.—In the *Essex Naturalist* xxvii, p. 210 (1943) G. Dent states that the owner of Hylands, near Chelmsford, reports that there were six nests in the small heronry there in the spring of 1942, and that this heronry has been in use intermittently for some years. It does not appear to have been previously recorded in print.

CURIOUS BEHAVIOUR OF CORMORANT.—Mr. R. Y. Ferguson informs us that on August 22nd, 1943, he observed a Cormorant (*Phalacrocorax c. carbo*) pitch about 60 ft. up on a tall tree by the Clyde and spread its wings in the drying position. The bird then flapped off the perch, but as it did so gripped a branch with its beak, so that for fully five seconds it hung straight down suspended by the bill, at the same time opening its wings to the wind. It then flapped down to a lower branch and sat drying itself again.

BLACK-HEADED GULLS NESTING IN SHROPSHIRE.—Mr. A. W. Bolt informs us that about three or four dozen Black-headed Gulls (*Larus r. ridibundus*) nested this year on a marsh in Buckton, near Bucknell. The species has not previously been recorded as nesting in Shropshire.

REVIEW.

Dream Island Days. By R. M. Lockley. Illustrated (Witherby). 10s. 6d. net.

PRESUMABLY most keen ornithologists indulge in dreams at some time or another, but it comes to but very few of them to see their dreams fulfilled. Mr. Lockley must therefore be accounted one of the most fortunate in that he has, early in life, realised his wildest dream, to live alone, except for sympathetic companions, on an island with the birds. We already know from his writings what good use he has made of his opportunities and those of us whose dreams can never be fulfilled, except in a minor degree, must envy his lot and at the same time appreciate through his books how he surmounted all his difficulties and at last settled down to enjoy the fulfilment of his dreams. In the present book he touches but lightly and almost incidentally on the ornithological side of his work but has embodied with revisions those parts of his earlier ones, *Dream Island* and *Island Days* that tell of his day by day work and progress. It is the tale of a simple life spent on his beloved Welsh Island of Skokholm, the rebuilding of the house, the remaking of the farm, of shepherding, fishing, sailing and bird-watching, until at length he attained almost complete and self-supporting independence. Every page bears witness to the author's intense love of nature and his simple prose makes fascinating and charming reading. The tail-piece sketches by Mrs. Lockley are the same as those in *Island Days*, but a number of new photographic plates have been added, which give one a very good idea of the general lay out of the island and its amenities. At the end the author has given a list of the birds and plants so far identified on the island and it is to be hoped that when normal times return he will be able to resume the occupation of his home and give us in the future many more examples of his fascinating writings. N.F.T.

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SOME OBSERVATIONS ON THE COMMON POCHARD

BY

E. O. HÖHN, B.Sc.

THESE observations were made on the Common Pochard (*Aythya ferina*) in the years 1936 and 1937, almost all at Hay Mill Pond, Burnham, Bucks, where the species has nested annually since the beginning of the century.

It has seemed to me of some importance to indicate the number of occasions on which any particular form of behaviour has been observed.

ARRIVAL OF THE BREEDING STOCK.

This has been as follows at Hay Mill Pond :—

March 17, 1935,

March 21, 1936,

March 10, 1937 *cf.* Millais, who gives March 10-15.

COURTSHIP BEHAVIOUR.

This account is based on 12 observations in 1937 and 4 in 1938. The earliest occasion was March 16, the latest May 17, both in 1937. It may, as far as I have seen, occur at any time during the daylight hours and no period seems to be particularly favoured.

Postures and calls of the Male.—Three widely different postures were seen :—

1. "Forward." The neck is stretched out stiffly along the surface of the water.
2. "Backward." The head is rapidly thrown backwards and brought forward again.
3. "Dipping." The head is jerkily lowered and raised, remaining horizontal ; when the head is raised the neck is held very rigid.

During all these movements the bird often swims about rapidly and erratically. The neck looks broader than normally in courtship and this has been attributed by Millais to inflation with air. This seems to me unlikely on anatomical grounds, as it raises the question of what is the structure inflated. I think the appearance is due to erection of the feathers and I have noted a ruffled appearance of the feathers of the base of the neck in courtship.

Millais describes a blazing red appearance of the iris due to pupillary constriction accompanying sexual excitement. I am unable to confirm this. However, on August 4, I observed this appearance in a drake Pochard which was pursuing a Coot, which was carrying off a piece of bread. Other Pochards were present for comparison. Hence this appearance is perhaps produced by any emotional state.

During courtship a soft piping call sounding like "quee-week" is frequent. Also there is the strange wheezing note likened by Millais to the wheezing expiration of an asthmatic. It can be

closely imitated by breathing in through the nose while pronouncing "ng" as in ring.

Postures and calls of the Female :—

1. Swimming about with the neck held stiffly, jerking the head up and down.
2. Pecking the water while erratically swimming about.
3. On one occasion a female perched on a submerged tree trunk was seen repeatedly touching with its beak that of a male, which held its head stretched out towards her.
4. The posture which appears to solicit coition is a stretching forward of the neck with the head held upwards at an angle to the neck.

Two calls were heard : an explosive sound rather like "pwook," as well as the usual alarm note somewhat intensified, which to my ears sounds like "graa."

The behaviour sequence in Courtship.—This has in all observations been initiated by the drakes. Once one has started others soon imitate and one particular duck is often the centre of attraction for some time. This bird may not respond for some time but does generally at last become excited and moves about erratically. The drakes follow and are joined by others of either sex, the whole party moving about at considerable speed. Often one of the ducks turns round and makes a rush at some of the courting drakes, which then momentarily turn away, but soon follow the throng again courting. By this process one or two drakes assume the head of the party and swim ahead rapidly, not courting any more. They are followed by the ducks, still "head jerking" and by the other drakes still courting. Quite suddenly one of the ducks stretches out its neck and remains still. One of the leading drakes then mounts and coition occurs. The drake grabs hold of the back of the head of the duck during this. Coition was observed on four occasions and lasted about 15 seconds, during which the duck gradually sank lower and lower in the water. The other birds usually swim past still courting, but on one occasion two drakes rushed at the one copulating and a general *melée* ensued.

This seemed to be the typical sequence of events in all my observations.

A Discussion of Courtship Behaviour.—Several points about the courtship of this species deserve emphasis. Firstly, it appeared to be always a collective affair, in which all the birds on the pond took part.

Secondly, courtship with coition was observed repeatedly at a period when there were as yet no pairs, the birds feeding, resting or courting as a group.

It was often observed that a drake would court one duck, exciting it to jerk its head and would then turn off to court another duck and then back to the first or possibly a third, thus achieving nothing, as the ducks become placid again when not courted.

It has been observed that courtship was always initiated by a drake, and some of my observations make it possible to detect several stimuli which bring on this behaviour.

Courtship behaviour is not merely a response to the perception of a duck. On two occasions a drake Pochard was seen executing courtship movements when no duck was anywhere in sight (May 16, 1937, Shardeloes Lake, Bucks. and May 17 on a small pond at Kew Gardens). Although some sort of internal urge is therefore on occasion sufficient to initiate courtship behaviour the presence of a duck nevertheless also acts as a stimulus. Thus at Hay Mill Pond some drakes when lazily courting would often show a great intensification when a further duck appeared on the scene.

Finally imitation seems also to play a considerable role as shown in the following observation.

April, 13, 1937. Hay Mill Pond.—There where four males and three females on this part of the pond, of which one pair was on its own the female being perched on a partly submerged tree trunk. When the main group of birds commenced a vociferous courtship the drake of this pair left his mate to join in. The activity of this group was however, discontinuous; there would be periods of arduous courting separated by periods of rest. Whenever a rest period occurred a drake left the group and swam across to the solitary duck on the tree trunk only to leave her again whenever the main group became active once more. The whole process took about 40 minutes, after which the group separated into three pairs and two solitary birds.

The Formation of Pairs.—While with territorial passerines pairing may take place long before copulation occurs (Eliot Howard) the reverse is the case in the Pochard. Courting is done by a group of birds; drakes court indiscriminately this or that duck and after coition the partners separate, so that it is difficult to see how pairs are formed. At any rate this is a slow process. At Hay Mill pond courtship with coition was seen as early as March 16, while the birds were only loosely paired by April 13. It seems most likely that pairing is due to the duck chasing off in the manner described all drakes but one of those which court it. The drake concerned may thus gradually and by force of circumstances come to recognise this particular duck as distinct and so the pair, though at first meeting only in courtship, come to associate also in other activities. The female thus appears to have a choice of partner. Definite pairs are recognisable for a period of two months.

BREEDING DATA.

Incubation Period.—Two nests were observed during 1936. The minimal incubation periods were 24 and 28 days. Millais gives 24 days and *The Handbook* 24-26 days.

Time spent on the Nest.—Seven visits were made to the two nests during various times of the day and only on one was one of the ducks off the nest in the evening. A visit at 5 a.m. found the birds on the nests. On the one occasion when the nest was found free the eggs had been covered with a little down.

When disturbed the birds would slip off the nest into the water. "Injury-feigning", *i.e.* calling excitedly and shovelling the water with the wings, was seen on several occasions.

On May 27, 1936, while one of the incubating ducks was watched from a hide a young Coot came wandering up the short path leading from the nest to the water. The duck merely turned its head towards it, then faced the hide again. From this I conclude that a territory around the nest is not maintained.

Non-breeding Birds.—During four years of observation, 1935-1938, non-breeding birds were seen at Hay Mill Pond only in 1936, when four pairs nested and two pairs apparently did not attempt to do so and remained at the Pond until June 20.

Mortality of Young Birds for the first two months of life.—The four breeding pairs of 1936 produced 25 young, all being hatched by June 1. At the end of June, 23 were still alive, while at the end of July, 16 remained. The young are said to be unable to fly until two months old, so that decreases must be due to birds dying off. These figures give a mortality rate of 8% for June and 30.5% for July. Mortality later must be considerably lower, as at such rates all the birds would have died before the next breeding season.

Behaviour of adults and young.—During the first four weeks after hatching of the young all four families remained separate. The adult males and non-breeding females occupied the centre of the Pond; each of the families occupied a part of its side. Although each family kept more or less to one area movements to another were not rare within the duration of a three hour visit. Moreover Coots, Dabchicks and Moorhens often fed among the Pochards.

The young even when only a day old were never fed by their mother. They dived and also briskly dashed about snatching up things from the surface of the water.

The young were almost continuously busy with feeding whereas their mothers dived much more rarely. When disturbed by my appearance the adult generally erected its neck stiffly and called something like "gurr." At this the young would stop feeding and huddle together. If nothing further occurred they soon recommenced feeding, although the mother would still be tensely watching. If the group was approached too much the adult would swim away followed by her young.

As the birds get older they tended more and more to move about independently, and by July 22 the family groups had completely broken up.

The adult males showed no relationship with the family groups, but spent most of their time sleeping or preening on the main pond. They were only seen diving in the evening.

DEPARTURE OF ADULTS AND YOUNG.

During three seasons the departure of the adult males from the nesting pond was throughout June.

The adult females left about a month after the males, *i.e.* about the end of July and the first days of August. While still guarding their young their diving was mostly in the evening, while after the break-up of the families diving in the day became more frequent.

The young birds left during August and early September.

DIVING AND DIVE TIMES.

The typical dive seems to last about 20 seconds and is preceded by a leap during which the bird seems for a moment to leave the surface of the water, but I have seen many modifications.

On September 9, 1936, a young bird made curious dives during which it maintained itself very near the surface, as the kicking of its feet caused a visible swell on the surface. Moreover on emerging its tail came up first whereas usually the birds pop up in a fairly horizontal position.

On two occasions I saw Pochards feeding in the end-up position common with surface-feeders.

Swimming about with only the head and neck submerged in the manner of swans was also seen.

Dewar makes the following points as to the diving of this species. He finds 3 feet to be the optimum depth and gives the following average times for various depths.

1 foot	8.1 secs.
2 feet	11.9 "
3 "	15.4 "
3½ "	16.7 "

Moreover he finds a dive-pause ratio of 2.2.

As to optimum depth my observations are more or less in agreement, the favourite diving area being the centre of the pond, the depth of which was 2½ to 4½ feet.

Altogether I timed 56 dives of adult (as it happened all male) Pochard, which gave durations of 10 to 25 seconds. I think the relationship between dive duration and depth is less rigid than he infers; for dives of a bird at the same place often varied greatly in duration, sometimes up to 100%.

Only for one series of 9 dives was I able to establish the depth accurately, namely 2½ feet, average time being 11.8 secs.

The dive-pause duration of 27 dives came to 2.1. Dives of young birds are naturally shorter.

A bird 3-8 days old gave an average of 8.1 secs. for 7 dives. A bird of about two months old gave an average of 20.5 secs. for 9 dives, minimum being 15, maximum 27 seconds.

DAILY CYCLE OF ACTIVITY.

The Handbook states: "Spends much of day resting on open water, feeding principally in morning and evening, though also to a varying extent at night."

As to night feeding I made only two visits in February on both of which the birds were found diving well after nightfall. On

attempting to discover the favourite feeding periods I obtained the following figures :—

<i>Time</i>	<i>Number of observations</i>	<i>Occasions when birds found diving</i>	<i>Percentage.</i>
Dawn	6	3	50%
Morning	10	4	40%
Noon	15	5	33%
Afternoon	21	6	25%
Evening	7	4	56%

This shows the afternoon to have been the time when the birds were most rarely seen diving. Morning and evening are confirmed as favourite periods for diving.

MIGRATORY MOVEMENTS.

The serial counts sent in in reply to the 1935 B.T.O. enquiry show that at all times of the year numbers fluctuate at any one place almost from day to day. These movements are, however, probably largely of local character, as the counts published by R. C. Homes show a fairly constant number for the last 3 months of the year in figures affecting the whole London area.

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NEST-SITE SELECTION BY BIRDS

BY

CAROLINE AND DESMOND NETHERSOLE-THOMPSON.

(Concluded from page 94),

PEREGRINE FALCON (*Falco p. peregrinus*).

Male attempts to induce female to select various scrapes which he has made, but female has final say. Scrapes may be brooded for longish spells some days prior to laying. In selecting new site for "repeat-nest," both birds—female in particular—fly in and out of various holes and caverns in cliff, but in early stage this is probably really a "substitute activity." With established pairs, same eyrie sometimes used for many years in succession. In one case male brought second female to eyrie of former mate which had recently been killed, and the new mate laid in it (D.N-T.). Two clutches—each of four eggs and by different females—found in same scrape. Male evidently brought second mate to her predecessor's eyrie and induced her to use it (C. V. Stoney). Within 36 hours of destruction of female, male seen bringing back a second mate, and on arrival he dived down to site in which there was a perfect bowl prepared by the dead bird. New falcon used another ledge for her first attempt, then reverted to original eyrie after robbery (G. Witherington, *Brit. B.*, Vol. iii, pp. 263-4). Female may change her mind after appearing definitely to have chosen a certain site. At least two scrapes formed although these are sometimes on same ledge (H. A. Gilbert, *Brit. B.*, Vol. xxi, p. 26). Male brings new female to old nesting-site (G. Dent). Above account should be correlated with J. Hagar's detailed description of North American Peregrine (in A. C. Bent's *L. Histories of N. American Birds of Prev.*, II, pp. 44-46). In this it is stated that at first female takes little notice of male's suggestions, except to disagree with them! but after coition, she herself begins to take a greater interest and the interest of the male in nesting-shelves now begins to wane in inverse proportion to the female's increasing, though somewhat factive, activity.

HOBBY (*Falco s. subbuteo*).

Established pairs frequently appear to select site and roost close to eyrie which will contain their eggs four to five weeks later (W. H. Thompson, *Handbook III*, and D.N-T., *Ool. Record*, Vol. xii, p. 58).

At a later stage, however, female, often with male in vicinity, broods upon nest for long spells fully a week before laying, and from time to time may call up male and with him (or alone) goes from nest to nest squeaking sharply. In each case watched female, if undisturbed, returned to nest upon which it had been brooding. If disturbed, however, during broody-phase, desertion of site is not infrequent. Copulation often occurs during these inspection tours (D.N-T., *Ool. Record*, Vol. xii, pp. 58-59). Shortly after robbery both birds may dive over possible nesting woods, calling noisily, and female goes on to, inspects, and broods, various nests. This occurs even if second clutch is not laid, birds exploring large tract of country (D.N-T.). Female examined and brooded nests in mid-May in presence of two males (C. V. Stoney). Female, calling noisily, examines potential nesting premises time after time before coming to a decision (J. W.-Bond, *Brit. B.*, Vol. xxv, p. 202).

MERLIN (*Falco columbarius æsalon*).

Both sexes prospect nest-sites, but female decides in presence of male. One female used same tree-nest in two consecutive seasons. She alone appeared to examine this and another tree-nest in presence of male. This happened some 10 days before deposition of first egg (D.N-T.). About a fortnight before laying both birds engage upon site-selection tours during which female, squealing, broods upon various parts of heathery banks, in presence of male which calls noisily from perch or a-wing (C. V. Stoney).

KESTREL (*Falco t. tinnunculus*).

Both sexes participate in site-selection tours during which copulation may take place. These occur fully three weeks before laying. Male also seen to feed a lizard to female, calling her to site eventually selected. After coition female, followed by male, entered hole in rocky outcrop, but this was not used (C. and D.N-T.). Both sexes—male taking initiative—seen examining possible nesting sites in early March, 1943 (C. and D.N-T.). Male chooses nest-site (H. Ecke, *Handbuch deutschen Vogelkunde*, II, p. 169).

GOLDEN EAGLE (*Aquila c. chrysaëtus*).

Both sexes participate, but in established pairs female appears to decide. Both birds may make display flights rising and diving, pitching uneasily on different eyries, sometimes brooding them, etc. during late site-selection phase (I. E. Hills and D.N-T.). Male known to take new female to old eyrie in year following death of former mate (G. Dent). In such cases male apparently acquaints female with various alternative eyries, one of which is generally, but not invariably, used (D.N-T.).

COMMON BUZZARD (*Buteo b. buteo*).

In freshly formed pair, male may influence female's choice of nest-site, but in established pairs female probably chooses. In some cases same eyrie used year after year. In 1930-32 same eyrie occupied by a certain female which annually produced four eggs at approximately same date each year. In 1933 this eyrie was occupied by a different female, which laid c/3 considerably later. In this case male probably selected site for new mate as his behaviour strongly suggested that he was the same bird as in 1930-32. In one case female, disturbed from her own eyrie, hurriedly selected, lined, and laid in old crow's nest. All this took place within 36 hours. At another site when the female was destroyed the male re-mated and brought in a new female which occupied the eyrie prepared by her predecessor.

MARSH-HARRIER (*Circus æ. æruginosus*).

Female selects nest-site (J. Vincent).

MONTAGU'S HARRIER (*Circus pygargus*).

Male prospects prior to arrival of female, but during actual selection male did not settle on ground although while female was thus engaged he "waited on" overhead or perched on a vantage point. Female examined various spots before deciding. Each female selected her own nest-site in bigamous pairing observed (G. Dent). Female, in presence of male, drops into and examines various possible nest-sites. Copulation occurs during this phase (P. M. Meeson). Female chooses nest-site (J. Vincent).

HEN-HARRIER (*Circus c. cyaneus*).

Female drops into various possible nest-sites; male usually present although he takes no active part (J. S. Douglas). Unmated male selected and built nest (E. Rosenberg, *Beitr. Fortpfl-biol. Vögel*, 1933, p. 119).

SPARROW-HAWK (*Accipiter n. nisus*).

Female in established pairs appears to choose nest-site, although male may also influence choice, particularly in pairings following destruction of female (D.N-T.). Male has some voice in selection of nest-site (J. H. Owen, *Brit. B.*, Vol. xii, p. 81). Male took lead in site-selection, taking new female to one old nest after the other (P. Marshall).

COMMON HERON (*Ardea c. cinerea*).

Cock selects nest-site, but some hens definitely lay in same nest two or more years in succession. If robbed further clutches are generally laid in same nest.

BITTERN (*Botaurus s. stellaris*).

Female definitely chooses nest-site (J. Vincent).

MUTE SWAN (*Cygnus olor*).

Female usually chooses nest-site (J. Vincent).

SHELD-DUCK (*Tadorna tadorna*).

Drake seen to lead duck to burrows and bundle her into one after another (D.N-T.). Drake takes part in site-selection, but duck enters and explores holes (Phillips, *Nat. Hist. of Ducks*, I). Drake accompanies duck and forces her to explore holes (F. C. R. Jourdain).

MALLARD (*Anas p. platyrhynchos*).

Duck seen examining and testing various parts of marsh. Subdued quacking heard. Drake not present (D.N-T.). Duck selects nest-site (J. Vincent).

TEAL (*Anas c. crecca*).

Drake accompanied duck to little pool and waited for her while she tested and brooded various places in forest clearing (D.N-T.). Duck selects nest-site (J. Vincent).

GARGANEY (*Anas querquedula*).

Duck chooses nest-site (J. Vincent).

WIGEON (*Anas penelope*).

Duck chooses nest-site, drake absent in case observed. Duck quite silent during exploration of heathery fringe.

PINTAIL (*Anas a. acuta*).

Female alone chooses site, but male is present during building (Naumann, Vol. x, p. 132).

SHOVELER (*Spatula clypeata*).

Female alone chooses site, but male is present during building (Naumann, Vol. x, p. 132).

SCAUP-DUCK (*Aythya m. marila*).

Same nest-scraper used two or more years possibly by same duck (P. H. Bahr, Brit. B., Vol. ii, p. 216).

COMMON EIDER (*Somateria m. mollissima*).

Drake frequently accompanies duck during nest-site selection, but at no other time (E. Miller). Duck alone selects and lines nest-site (A. O. Gross, Auk., 1938, pp. 387-400).

GOOSANDER (*Mergus m. merganser*).

Female seen to enter two tree hollows in succession, brooding short spells in each, drake calling nearby. Drake also calling on burn while duck exploring bank. These incidents took place some time before laying began, but precise interval was not ascertained.

RED-BREASTED MERGANSER (*Mergus serrator*).

One scrape used two or more years, possibly by same duck (A. Whitaker).

CORMORANT (*Phalacrocorax c. carbo*).

Apparently both sexes participate, but exact share not ascertained.

SHAG (*Phalacrocorax a. aristotelis*).

Both sexes appear to share in site-selection and coition occurs on chosen site before actual building has begun. Unmated males also display on sites selected (E. Selous).

STORM-PETREL (*Hydrobates pelagicus*).

Exact method unascertained, but brooding of chosen site prior to laying is a feature of phase (C. V. Stoney).

LEACH'S FORK-TAILED PETREL (*Oceanodroma l. leucorrhoa*).

"About three days are consumed in building the burrow. During first evening the site is chosen and entrance way constructed." In three cases by male alone (W. A. O. Gross, Auk, 1935, pp. 382-399).

MANX SHEARWATER (*Puffinus p. puffinus*).

In early site-selection phase single bird (apparently either sex) sits at mouth of nesting-hole (R. M. Lockley). Both birds found together in burrow long before egg is laid (C. V. Stoney).

FULMAR PETREL (*Fulmarus g. glacialis*).

One bird (sex ?), and in some cases pair, examine and squat upon potential nest-sites from early March onwards.

GREAT CRESTED GREBE (*Podiceps c. cristatus*).

Either sex may choose nest-site, as female does not necessarily accept and continue "rafts" made by male (J. Vincent).

SLAVONIÁN GREBE (*Podiceps auritus*).

In one case watched, both birds together examined various spots and later in afternoon both built. Male in some cases may dictate choice of first nest. In joint site-selection special calls were used.

LITTLE GREBE (*Podiceps r. ruficollis*).

Both sexes appear to participate in site-selection.

WOOD-PIGEON (*Columba p. palumbus*).

Both sexes appear to share in site-selection, sometimes brooding side by side in old ivy on selected site long before laying (C. V. Stoney). Both sexes help to choose site upon which they may build shortly after selection (J. H. Owen).
 ROCK-DOVE (*Columba l. livia*).

Both sexes together seek nest-site making short, uneasy flights up and down cliff, female (?) followed by male (?) going into holes in rocky outcrop one after the other. On one occasion this happened fully a week before building.
 TURTLE-DOVE (*Streptopelia t. turtur*).

Both birds together fly from one bush to another, but exact share of each sex unascertained (J. H. Owen and D.N.-T.).

COMMON CURLEW (*Numenius a. arquata*).

Male may choose site and scoop out several bowls, one of which female may line and complete, but this is not an invariable rule. Exact period at which female finally decides upon the nest-site appears to vary.

WOODCOCK (*Scolopax rusticola*).

Female appears to choose site and form depression after spell of brooding during which male squats nearby. Selection certainly sometimes is made fully a week before laying, but individual birds probably vary.

COMMON SNIPE (*Capella g. gallinago*).

Single bird (sex ?) flushed from scrape at which it was working. Second bird not seen.

RED-NECKED PHALAROPE (*Phalaropus lobatus*).

Both sexes co-operate in scrape making, but shortly before first egg was laid "female went from one nest to another without hesitation visiting four nests.... In the fourth nest she stayed longer and here she laid her first egg" (N. Tinbergen, *Ardea*, 1935, p. 12).

SOUTHERN DUNLIN (*Calidris alpina schinzii*).

Single bird (sex ?) seen preparing scrape. Male not in immediate vicinity (C. and D.N.-T.). Female alone seen forming scrape (one record) (C. V. Stoney).
 RUFF (*Philomachus pugnax*).

Nest-site almost certainly chosen by female alone (F. C. R. Jourdain).

COMMON SANDPIPER (*Actitis hypoleucos*).

Cock makes preliminary hollows, but hen appears to decide at later stage. Cock present while nest being finally prepared, scanty lining generally being added during egg-laying phase.

GREEN SANDPIPER (*Tringa ochropus*).

Unmated cock unquestionably chooses nesting-territory, displaying in air, calling from trees, etc., but no evidence that he actually inspects nests.

BRITISH REDSHANK (*Tringa totanus britannica*).

Some days before laying, female, in presence of male, which stands nearby, chooses nest-site and forms depression (C. and D.N.-T.). "Cock-nest"—no record of male seen at work given—found on April 8th. Contained two eggs on May 5th (J. F. Thomas, *Brit. B.*, Vol. xxxvi, p. 27).

GREENSHANK (*Tringa nebularia*).

Studied in detail by C. and D.N.-T. Male and female embark on nest-site selection tours a few days before laying. In some cases the male certainly proposes nest-sites, but female disposes. Exceptionally, male, perched on dead tree, calls up female and prompts her to make selection. Frenzied singing and aerial display frequently a prelude to site-selection. In bigamous pairings all three birds may together walk over ground, using special calls, characteristic if not entirely confined to, site-selection phase. Females, however, decided upon nest-site which they formed or elaborated in presence of male. Both females together collaborated in preparing nest in which both laid, but one female may dominate the other. In another case the male took each female, one after the other, to the coveted territories. Both females finally nested within radius of 150-200 yards. Two different females known to lay in successive years in same scrape, this probably due to male having re-mated and brought new mate to old nesting area. Site once selected and bowl formed 13 days before laying. One particular female laid three years in succession in same scrape, which she prepared and re-lined annually. This is abnormal.

RINGED PLOVER (*Charadrius h. hiaticula*).

Cock normally makes scrapes, one of which female selects, but her choice appears to be final (C. and D.N-T.). Male forms nest-scape (H. Laven, *Beitr. Fortpfl.-biol. Vögel*, Vol. xiv, pp. 45-54).

LITTLE RINGED PLOVER (*Charadrius dubius curonicus*).

Nest-site apparently selected following phase of nest-making (e.g., both sexes scraping on June 5th, first egg laid on June 10th), (cf., R. C. Ledlie and E. C. Pedler, *Brit. B.*, Vol. xxxii, pp. 92-3).

SOUTHERN GOLDEN PLOVER (*Pluvialis a. apricaria*).

Both sexes form scrapes but although males may form preliminary hollows, female apparently has final say. Nest-sites exceptionally selected and hollows formed three weeks before laying, but this is abnormal. Female works more energetically in scrape-forming during sexually receptive phase.

DOTTEREL (*Eudromias morinellus*).

Studied in detail by C. and D.N-T. Both sexes indulge in scrape-making. At first independently later in concert. Female may keep tag on some of the hollows formed, but a new scrape is sometimes made and egg almost immediately laid in it (Three records).

LAPWING (*Vanellus vanellus*).

Female normally accepts and lines one of male's original display- or "rocking hollows" but this is not invariable custom, as we have proved that she may select site and prompt him to form nest well away from original display centre although he also initiates new nest. Some females may also take over and scantily line, just before laying, old, and even new, nest-scrapes of Golden Plover.

AVOCET (*Recurvirostra avosetta*).

Nest-site apparently selected from hollows formed during combined scrape-making phase (G. F. Makkink, *Ardea*, 1936, pp. 1-62).

BRITISH OYSTER-CATCHER (*Hæmatopus ostralegus occidentalis*).

Male forms preliminary hollows, but female appears to make final choice which may have no relation to original "suggestions." During selection-phase female seen to run from one place to another brooding patches without actually forming scrapes. Later scrape may be brooded for long spells before laying. One female used same scrape in four consecutive seasons.

STONE-CURLEW (*Burhinus a. ædicnemus*).

Both sexes prospect for nest-site. Brooding of empty scrape, presumably by female, noted on day before laying of first egg (D.N-T.). Same female, and probably same pair, nested three years in succession within a radius of one foot (G. Dent).

GREAT BUSTARD (*Otis t. tarda*).

Female alone formed scrape (W. H. St. Quintin, *Avic. Mag.*, 1931, p.131).

SANDWICH TERN (*Sterna s. sandvicensis*).

Both sexes form scrapes, in one of which female lays.

ROSEATE TERN (*Sterna d. dougallii*).

Both birds may brood on selected site before scraping begins (C. V. Stoney). Both sexes form scrapes, but female probably finally decides (D.N-T.). In one case Common Tern laid in nest of this species, but when attempting to brood eggs was pushed off by owner (A. Benington).

COMMON TERN (*Sterna h. hirundo*).

ARCTIC TERN (*Sterna macrura*).

LITTLE TERN (*Sterna a. albifrons*).

Both sexes form a number of scrapes, in one of which female lays (G. Marples, *Sea Terns*, 1934, et al.)

BLACK-HEADED GULL (*Larus r. ridibundus*).

Site selected and nest begun by male, female co-operating at later stage (F. B. Kirkman, *Bird Behaviour*, 1937, pp. 71-73).

COMMON GULL (*Larus c. canus*).

Pair use special posture with head lowered, etc. during nest-site selection (H. Wachs). This also noted in Scotland, but from time to time presumed male flew away calling and ringed round moor; on return, bird on ground tilted forward, but faced away. Brooding on empty scrape by female a noticeable feature, male frequently standing beside nest (C. and D.N-T.)

HERRING-GULL (*Larus a. argentatus*).

Female (?) broods for long periods on nesting-ledge prior to scrape-making phase (D.N.-T.). Site-selection connected with special ceremony (F. Goethe. *Journ. f. Orn.*, 1937, pp. 1-119 and A. F. J. Portielje. *Ardea*, 1928, pp. 112-149), but this is not confined to site-selection only. Approximately same "core-territory" selected annually by each female (G. A. Garceau and D.N.-T.).

BRITISH LESSER BLACK-BACKED GULL (*Larus fuscus graellsii*).

GREAT BLACK-BACKED GULL (*Larus marinus*).

Before scrape formed or nest constructed birds may brood on nesting-ledges. Approximately same "core-territory" selected annually by some females (G. A. Garceau and D.N.-T.). Site-selection connected with special ceremony of emotional bond type (R. Richter and F. Darling).

KITTIWAKE (*Rissa t. tridactyla*).

Both sexes co-operate in site-selection. Special rite employed. One sex (female?) appears to take initiative in selection.

BRITISH RAZORBILL (*Alca torda britannica*).

Male selects territory and thus may have important influence on choice of nest-site (D.N.-T.). Female proved to return to same cranny in successive years (O. A. J. Lee).

SOUTHERN GUILLEMOT (*Uria aalge albionis*).

Male selects territory (H. E. Howard, *Territory in Bird-Life*). Same female—identity proved by distinctive egg-type—bred on same part of ledge until this broke away, then she removed to another nearby. All told she was traced for 32 years (F. G. Lupton quoted by D.N.-T. in *Ool. Record*, xiv, p. 20).

BLACK GUILLEMOT (*Uria g. grylle*).

Trio of birds, calling noisily, rise from sea and fly in circles for few minutes and then one detaches itself and flies into cliff crevice in which it remains. Eggs laid two to three weeks later in sites now selected (C. V. Stoney).

SOUTHERN PUFFIN (*Fratercula arctica grabæ*).

Single birds continuously enter and leave rabbit holes, standing on edge for short periods after emerging. This may be repeated many times and has been noted from late April onwards (C. V. Stoney and D.N.-T.).

CORN-CRAKE (*Crex crex*).

Male chooses territory in which female apparently selects nest-site.

WATER-RAIL (*Rallus a. aquaticus*).

Males make many nests, one of which is sometimes accepted and finished by female. At other times, however, male helps to complete nest on site chosen by female (J. Vincent). "Cock nests" noted (D.N.-T.).

MOORHEN (*Gallinula c. chloropus*).

Building of platforms may begin in mid-February, but female may make final choice (D.N.-T.). Both sexes co-operate in nest-site selection (J. H. Owen).

COOT (*Fulica a. atra*).

Male may initiate platforms, but female does not always accept one of them (D.N.-T.). Site may finally be chosen by either sex (J. Vincent).

CAPERCAILLIE (*Tetrao u. urogallus*).

Site selected and depression formed by female shortly before laying.

BRITISH BLACK GROUSE (*Lyrurus tetrix britannicus*).

Female may brood on selected spot for longish period before forming scrape.

BRITISH RED GROUSE (*Lagopus s. scoticus*).

Male exceptionally forms scrapes, but nest-site chosen from a number formed by female.

SCOTTISH PTARMIGAN (*Lagopus mutus millaisi*).

Site chosen from a number of scrapes formed by female. Male once seen escorting female while she was scrape-making.

PHEASANT (*Phasianus colchicus*).

Site selected by female.

COMMON PARTRIDGE (*Perdix p. perdix*).

Male seen accompanying female while she is scrape-making, but no definite evidence that he influences her in her choice of nest-site.

QUAIL (*Coturnix c. coturnix*).

Hollow prepared by female (*Handbook*, Vol. v, p. 251).

[ERRATUM.—On p. 94, under Sand-Martin, for "Vol i" read "Vol. I.]

NOTES.

FEATHERS AS NESTING MATERIAL
OF RED-BACKED SHRIKE.

ALTHOUGH the occasional use of feathers as nesting material of the Red-backed Shrike (*Lanius c. collurio*) has been referred to by several authors (cf. Kearton, *British Birds' Nests*, 1907 and Walmesley White, *Bird-life in Devon*, 1931) no mention is made of their use either in *The Handbook* or in some earlier standard works. It may therefore be of interest to record that in a nest near Bristol on July 4th, 1943, I found that feathers (of domestic fowl) were loosely woven in all round the rim. This, in effect, giving the nest an unusually large, and rather untidy appearance. A detailed inspection after the brood had flown showed that feathers were present in considerable numbers throughout and, in fact, formed the greater part of the material used. Poultry runs on a nearby building estate provided a ready supply of feathers, this no doubt being the reason for the birds using them so extensively.

H. H. DAVIS.

SHRIKES seldom use feathers as material for nest-building and and then as a rule only to a limited extent. In fact it is quite unusual to find a nest with feathers according to my experience, which extends to some hundreds of nests. Even then not many are used and it would be exceptional to find as many as a dozen included in a nest. Through the kindness of Mr. H. F. Witherby, Mr. H. H. Davis has sent me the nest referred to above for examination. I have never seen such a nest before. From the very beginning feathers have been used as material to such an extent that they are one of the main means of construction. They are well woven into the other material in the body of the nest and some even help to line the nest. Those used on the brim of the cup alone are not well attached to the nest. I have seen nests, in which feathers were used, in which these were not properly woven in to the other material, but the ends jutted out of the nest. There is nothing of that about this nest. All the feathers are from domestic poultry. It is in areas where many fowls are kept that I have myself found Shrikes using feathers. I consider that it is extremely rare for them to use any feathers beyond those of poultry. I have examined ten nests in Shropshire this year and there is not a feather in the lot. There are no poultry near where eight of the nests were built and only a very few, belonging to small holdings, in the areas round the other two.

J. H. OWEN.

SPOTTED FLYCATCHER HATCHING AND REARING
BROOD AFTER DISAPPEARANCE OF MATE.

FROM observations in 1941, I was able to record that although one of a pair of Spotted Flycatchers (*Muscicapa s. striata*) nesting in my garden at Patchway, Gloucestershire, disappeared while

incubation was still in progress, the remaining bird continued to incubate and successfully hatched and reared the young (*antea* xxxv, p. 228). As it is often assumed that, with most species, two birds are necessary to rear a brood the matter appeared to be of some interest, and as the breeding-site is an annual one I kept close watch in subsequent seasons for any similar event. Observations in 1942 showed that two broods were reared, the same nest being used on each occasion and both parents being present throughout. In 1943 the birds were building late in May and incubation started on or about June 3rd. From then onwards little was seen of the second bird of the pair, and during the last seven days of incubation it was certainly not present, nor at any time afterwards. The remaining bird carried on and, as in 1941, hatched and reared the young (four). While it may reasonably be concluded that one of the pair met an untimely end there was no evidence of this and it seems unlikely that such would occur twice in three seasons in the same garden. It may, indeed, be suggested that in both instances it was a case of desertion on the part of the missing bird, and an intensive study of the Spotted Flycatcher would perhaps show that desertion (presumably by the male) does sometimes take place, even during the period of incubation.

H. H. DAVIS.

GREAT REED-WARBLER IN NORTHAMPTONSHIRE.

I WISH to report the presence of a Great Reed-Warbler (*Acrocephalus arundinaceus*) near Oundle, Northants, between June 9th and June 20th, 1943.

The bird was first observed on the 9th by the River Nene, at a place where there is a small clump of willows above the tow-path and some tall reeds in the water below. I was attracted to the place by an unfamiliar song, which reminded me of a Sedge-Warbler's, but was much louder and harsher. I had one glimpse of the bird that day. It seemed to me like a large Reed-Warbler with a prominent eye-stripe.

Next day I returned to the spot with David Wise, who, by careful manœuvring managed to approach to within 15 feet of the bird, which he describes as follows:—"A little smaller than a Starling, olive-brown above, with a prominent eye-stripe, whitish on the throat and breast, tinging to a buff colour on the belly and under-tail coverts."

On June 10th we disturbed it from the reeds where it was singing; when it flew off, it kept low over the water with its tail fanned (this fanning was noticeable whenever it flew low over the water), and then rose nearly vertically to a willow where it began to sing.

Its song resembled that of a Sedge-Warbler, but it was much louder (it seemed loud even at a quarter of a mile), and considerably harsher, although at times it did become more musical. A harsh "chack" was also frequently heard. It would sing as much, if not

more, from the willows as from the reeds. When singing in the willows it was very restless, hopping or flitting from one twig to another continually.

On the 17th, when we next went, it was still there. It left between the evening of the 20th and the afternoon of the 21st. During the twelve days of its stay (it may have been longer, for I did not visit the place before the 9th) it did not leave the quarter mile stretch of river.

D. M. G. WISHART.

BLACKBIRD KILLING SLOW-WORM.

In *The Handbook of British Birds* the Slow-worm (*Anguis fragilis*) is recorded as having been killed by the Mistle-Thrush (*Turdus v. viscivorus*), but is not mentioned in connection with the Blackbird (*Turdus m. merula*).

On June 15th, 1943, I saw from my car a male Blackbird pecking at a still struggling Slow-worm at the side of the road. As I stopped the car a portion about an inch long was broken off and the Blackbird flew away with it; in a few seconds it returned and as I was getting out of the car flew off with the remaining portion then about seven inches long. I did not see any portion actually swallowed, but I think part of the Slow-worm had already gone when I first saw it.

C. J. F. COOMBS.

SWALLOWS ADDING TO NEST AFTER BEGINNING INCUBATION.

THIS year a pair of Swallows (*Hirundo r. rustica*) reared two successive broods in the porch of my house. The first nest was commenced on May 15th. Both birds participated in its construction and very rapid progress was made. When a few days later these activities ceased and it was noticed that incubation had started I naturally concluded that the structure had been completed. This, however, was not the case. After the female had been sitting for about five days building operations were suddenly recommenced and during the next 48 hours were continued energetically until the wall of the nest was nearly doubled in height. Meanwhile (save at night) incubation could only be carried out intermittently. This unusual behaviour made me doubt whether the nest really contained eggs. I therefore took a pair of steps and ascertained that a clutch had, in fact, been laid.

It would be interesting to know what caused the birds to make these drastic alterations to the nest. Was the original structure too shallow and consequently too exposed to view? Or was it merely the opportunity offered by a heavy shower of rain which made mud much more easily obtainable than during the initial stages of construction? Incidentally, the mud of this second period of building—gathered from a different source—was much paler in colour, and this had the effect of giving the finished nest a rather curious appearance.

COLLINGWOOD INGRAM.

BREEDING OF BLACK-NECKED GREBES IN CHESHIRE.

FOR the third time in the last five years Black-necked Grebes (*Podiceps n. nigricollis*) have hatched a brood in Cheshire. This year they nested in a pool where they have been seen before, but the broods in 1939 and 1941 were reared on other waters.

Mr. P. Askey first saw the young on July 2nd. When Flt.-Lt. E. Cohen and I saw them on the 5th they were carried on the back of one parent and fed there most assiduously by the other.

Mr. Askey noticed that they drove Dabchicks (*Podiceps r. ruficollis*) away while the young were small, but later paid little heed to them.

A. W. BOYD.

WOOD-PIGEON'S NEST WITH THREE YOUNG.

ON August 28th, 1943, the nest of a pair of Wood-Pigeons (*Columba p. palumbus*) held three well fledged young, one of which was noticeably bigger and stronger than the others.

On the 29th the bigger bird flew from the nest-tree and remained apart from its late companions. It was cared for by one parent only.

On the 30th the other two young left the nest and perched together in nearby trees until September 7th during which time they were fed entirely by the other parent.

This is my first record for N. Cornwall, over a period of many years, of more than two young being reared by one pair.

B. H. RYVES.

BIRDS ON BEDFORD SEWAGE FARM.

TO the records of birds seen on Bedford Sewage Farm by J. A. Miller in 1942 and 1943 (*antea*, p. 75) I can add the following noted on occasional visits made in earlier years.

GARGANEY (*Anas querquedula*).—One on August 21st, 1938 and a considerable number on August 13th, 1939, when six were seen on the wing together and there were certainly others present.

GREENSHANK (*Tringa nebularia*).—One on August 21st, 1938. According to Steele-Elliott (*Vertebrate Fauna of Bedfordshire*, p. 163) this species occurs annually on the sewage farm.

GREEN SANDPIPER (*Tringa ochropus*).—At least five on September 20th, 1936, about a dozen on August 21st, 1938 and several on August 13th, 1939. According to Steele-Elliott (*l.c.*, p. 159), this bird occurs regularly in the county, sometimes in considerable numbers. He mentions that he never visited the sewage farm in the first week of August without seeing this species. It seems hardly correct therefore to include it among "unusual birds."

W. B. ALEXANDER.

TERNS MIGRATING WEST IN SPRING.

DURING a voyage eastward across the Atlantic in 1943 when the ship was approximately 200 miles west from the coast of Kerry, on May 22nd, four terns passed the bows flying west. On five other occasions during the remainder of the day others were seen, all travelling in the same direction.

Next day none were seen until we were about to enter the North Channel. Thereafter all the way down the Irish Channel till dusk, parties of terns crossed the ship's bows regularly, all flying from the English to the Irish side.

Wynne-Edwards, in his account of "Birds on the North Atlantic" (*Proc. Boston Soc. Nat. Hist.*, Vol. xl, 1935), describes the migration of Arctic Terns (*Sterna macrura*) from west to east across the Atlantic in autumn, but he was unable to quote any actual observation of migration from east to west in spring, though he supposed "the main movement to take place about May 28th-June 3rd."

ERIC A. G. DUFFEY.

LESSER BLACK-BACKED GULL NESTING IN CHESHIRE AND SITTING FOR LONG PERIOD.

A PAIR of Lesser Black-backed Gulls (*Larus fuscus graellsii*) nested this year on a little dwindling islet, on which the Great Crested Grebe used to nest (see *Brit. Birds*, Vol. xxxiii, p. 84), in Witton Flashes, a salt subsidence at Northwich, Cheshire. This is the first known instance of the nesting of this gull in Cheshire. The birds began to sit on May 26th and continued to do so till July 18th, when they left the nest—a period of 53 days. The place was under the continual observation of Mr. S. A. Harper and others and I visited it frequently. Both birds incubated and the change over was often seen, and, especially after they had been sitting for six weeks, they were often seen to turn the eggs. The flash in which this islet lies has recently been fouled by the discharge of lime waste, which has killed everything in and round the pool. Lesser Black-backed Gulls visit the Flashes regularly—I have seen them there in every month of the year and a few are always present throughout the summer, but no pair has shewn a previous tendency to nest.

A. W. BOYD.

KITTIWAKES NESTING IN GLAMORGAN.

THE *Handbook of British Birds* does not include Glamorgan among the counties in South Wales where Kittiwakes (*Rissa t. tridactyla*) are known to breed. This year two pairs have nested at Worms Head and an immature Kittiwake is also associating with the two pairs. It is only possible to see into one of the nests, which contained only one egg on June 21st.

A. CALVER.

UNRECORDED NOTE OF YELLOW BUNTING.—Mr. G. K. McCulloch informs us that on June 5th, 1943, near Retford, Notts, a female Yellow Bunting (*Emberiza c. citrinella*), disturbed from a nest containing four quilled young, refused to leave the bush and kept uttering in an angry and aggressive way a note which might be rendered as "perritt, perritt, perritt" or "prrritt, prrritt, prrritt," rapidly repeated in a fairly low tone. The note sounded exactly like the noise made by a stoat when angry at being disturbed with a rabbit. The bird was heard to use the same note on a second occasion.

REED-WARBLED BREEDING IN WEST SOMERSET.—With reference to the note on this subject (*antea*, p. 77) Mr. A. V. Cornish informs us that on August 29th, 1943 at the same locality he had a close view of an adult Reed-Warbler (*Acrocephalus s. scirpaceus*) feeding a well-fledged young bird, which must have been one of a second brood.

LESSER WHITETHROAT IN CAITHNESS.—Flight-Sergeant N. W. Hussey informs us that on May 23rd, 1943, he identified a Lesser Whitethroat (*Sylvia curruca*) on the cliffs bordering Sinclair Bay, half a mile west of Noss Head. There was a thick sea fog and light rain at the time and the bird was first observed flitting from knoll to knoll. It eventually sheltered under a ledge on the cliff where it was examined with binoculars at a distance of ten yards. The species has rarely been recorded in Caithness.

SOOTY SHEARWATER OBSERVED IN MAY.—Sub.-Lt. E. A. G. Duffey, R.N.V.R., informs us that on May 23rd, 1943, off the north coast of Ireland, with Scottish isles in sight, he saw a bird which, from his description, was undoubtedly a Sooty Shearwater (*Puffinus griseus*). There appears to be only one previous record of the occurrence of this species in British waters in May.

BLACK AND BAR-TAILED GODWITS IN AYRSHIRE.—Flt.-Lt. Lewis Spolton informs us that between January 5th and February 11th, 1943, he repeatedly observed a Black-tailed Godwit (*Limosa l. limosa*) associating with numbers of Bar-tailed Godwits on the shore at Prestwick, Ayrshire. On the latter date it was seen to get up and fly away inland and was not observed again. The Bar-tailed Godwits (*Limosa l. lapponica*) were present during the winter in numbers up to sixty or seventy. Paton and Pike (*Birds of Ayrshire*) mention only two previous records of the Black-tailed Godwit in the county and the numbers of Bar-tails observed by Flt.-Lt. Spolton are larger than any which they mention. Other records of the former species have, however, recently been published in this journal (*antea*, Vol. xxxvi, p. 241).

SCANDINAVIAN LESSER BLACK-BACKED GULLS IN HERTFORDSHIRE.—Mr. G. K. McCulloch informs us that during the last five years visits of Lesser Black-backed Gulls to Watford Sewage Farm and Maple Cross in the Colne Valley have become more frequent and the majority have been of the British race (*Larus f. graellsii*). On two occasions he has identified single adults of the Scandinavian race (*Larus f. fuscus*), viz., on November 23rd, 1940, at Maple Cross and on January 23rd, 1943, at Watford Sewage Farm. On both occasions Herring-Gulls (*Larus a. argentatus*) and Great Black-backed Gulls (*Larus marinus*) were also present for comparison.

In recent years Lesser Black-backed Gulls with mantles decidedly darker than those of the British race have been reported on several occasions at the Tring reservoirs (see *Trans. Herts. Nat. Hist. Soc.*, Vol. xxi, pp. 146, 252 and 300).

HERRING-GULLS NESTING ON A HOUSE ROOF.—In *The Handbook* a single instance was quoted of the Herring-Gull (*Larus a. argentatus*) nesting on a house roof in Devon. Miss J. M. Ferrier informs us that this season (1943) a pair nested on the flat roof of a house about 200 yards from the beach at Porth, Cornwall. Three eggs were laid but were subsequently deserted owing to disturbance, though the birds continued to frequent the roof.

REVIEWS.

The Life of the Robin. By David Lack. (Witherby, 1943). Illustrated. 7s. 6d. net.

THIS is an altogether admirable little book. We cannot imagine anybody with the slightest bent for natural history—let alone any ornithologist—dipping into it without being fascinated and reading it through from cover to cover. Many readers of *British Birds* will be already aware of Mr. Lack's intensive studies of the Robin; his main paper in the *Proceedings of the Zoological Society* for 1939 was noticed at some length in this journal (*antea*, Vol. xxxiii, pp. 282-4). This may be described as a more "popular" treatment of the subject, using the term in the best sense. It is everything that a popular exposition by a scientific writer should be, clear, readable and told in straightforward language, yet losing nothing in accuracy and precision. It is written with great charm and humanity and frequently enlivened with apt and often entertaining quotations or "curious information" from earlier writers, zoological and otherwise.

The author's own studies, which have contributed so much to a fuller understanding of the life of the Robin, rightly bulk largely in the book. But, while naturally the treatment is more general and less detailed on the subject of these special researches than the original papers, it is at the same time more comprehensive, taking as its field the whole range of the Robin's life, including aspects such as nesting, food, migration and others with which these researches were not, or not primarily, concerned, but on all of which Mr. Lack has something original to say. In fact, it is impossible not to contrast this book with accounts of birds of the more old-fashioned and conventional type, in which too often much verbiage and loose generalization covers a remarkably small core of precise knowledge. Here, on the contrary, we find every aspect of the Robin's activities documented by accurate facts and exact observation. Yet the author is the first to stress that much more still remains to be learnt. "since subjects of this kind are inexhaustible," as Gilbert White said. The study ends with an interesting and valuable "Digression upon Instinct." Indeed one of the particular merits of the book is that it provides, in the author's own words, "a background summary of much of the modern work on bird behaviour." We cordially commend it to everyone interested in the life of birds. May the time not be too far distant when we can give as good an account at least of all the equally common species of our country. B.W.T.

Look at this Bird. Photographed and described by Reginald Gaze. (Faber & Faber, 1943). 5s. net.

THIS book does not contain, or profess to contain, anything particularly remarkable ornithologically. It is an assortment of photographs for young people and others who like pleasant pictures of birds. It includes some old photographer's favourites, such as Puffins and Kittiwakes, but is none the worse for that. The photographs are all good and a number of them notably so. The two of Jays at the nest are good studies of a wary species not often photographed successfully and we like especially the two of the Nightingale and the charming nestful of Willow-Warblers.

B.W.T.

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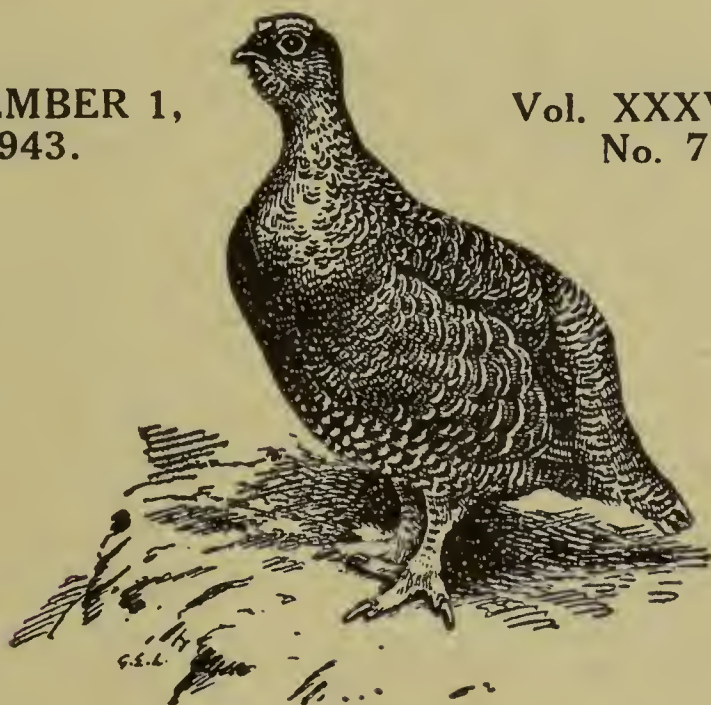
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THE PROBLEM OF PARTIAL MIGRATION*

BY

DAVID LACK.

INTRODUCTION.

A NUMBER of British breeding species show partial migration, some individuals of the species moving out of the country for the winter and others staying in the breeding haunts. Analysis of the ringing returns indicates that this phenomenon is different in certain sea and shore birds from what it is in certain Passerine and Limicoline species, as first pointed out by Landsborough Thomson (1926).

In this paper the returns of the *British Birds* and *Aberdeen University Marking Schemes* have been investigated for all those partially migratory species for which sufficient returns are available to permit a quantitative analysis. Only those individuals ringed as nestlings are considered, those trapped as juveniles or adults being excluded, as some of the latter may have been hatched outside Britain.

One point under investigation is the relation of age to migration. For this reason birds ringed later than 1936 are omitted from the analysis, as some of them will not have been recovered by 1942, while returns from France ceased in 1940. A few of the birds ringed in or before 1936 have also yet to be recovered, but the error from this source is small. It should perhaps be pointed out that the proportion of first-year to adult birds recovered is not the same, or even approximately the same, as the proportion of each type alive in the population.

To compare the ratio of migrants to residents, those individuals have been classified as residents which were recovered near where ringed during the period of year in which nearly all the migrants were recovered abroad. Some species migrate earlier or later than others, so that this period is somewhat different in different species. A few of the individuals recovered near where ringed during this period may, of course, have been migrants, but their number will be small.

Frequently in what follows the proportion of recoveries from France, Spain and Portugal is compared with that from Ireland, and with that from England and Scotland. These proportions are not necessarily the same as the proportions actually wintering in each of these regions, since one cannot tell whether the proportion of birds reported to birds dying is the same in each region. The proportion reported depends particularly on the density and interest of the human population. But this difficulty does not affect the conclusions of this paper, since the latter are based not on the actual

*A Publication of The British Trust for Ornithology.

resident to migrant ratios, but on the differences in these ratios for different parts of Britain and different ages of bird. A further difficulty arises if the proportion of those dying to those wintering is different in the different regions. However, one would not expect any marked difference in mortality, or natural selection would by now have favoured one type to the exclusion of the other. Of course part of the mortality among the migrants occurs on the sea crossing, which will leave no trace in the ringing returns.

For convenience of analysis, Britain has been arbitrarily divided into three regions, firstly Scotland and the Border counties of Cumberland, Westmorland, Northumberland and Durham, secondly "northern England"—Yorks, Lincs, Notts, Derby, Lancs, Cheshire and North Wales—and thirdly "southern England"—the remaining counties of England and Wales, approximately those south of a line through the Wash. Closer analysis might well reveal differences within these regions, particularly if the western counties were compared with the eastern. But there are not yet sufficient returns to permit a closer regional grouping, and the main differences in migratory behaviour would certainly appear to run north and south.

This paper is based solely on the ringing returns. For a general account of the migratory movements of the species concerned, the reader is referred to the excellent summaries by Ticehurst (1938-41), who has already described most of the movements discussed here. The object of the present paper is to provide a closer analysis, particularly in regard to the influence of age and breeding area on migration, and thereby to draw attention to a general biological problem of considerable interest and complexity.

I. PASSERINES.

SONG-THRUSH (*Turdus e. ericetorum*).

The most complete data are those for the British Song-Thrush, which will therefore be dealt with first. In this form, the division between residents and migrants is clear-cut. The birds either winter close to where they were ringed as nestlings or move for a considerable distance. Further, those which migrate south to France, Spain and Portugal are sharply separated from those which move west, mostly to Ireland with a few to south-west Scotland, south-west Wales, Cornwall and south-west Devon. Birds do not migrate to winter intermediately, in south-eastern and southern England—except for a single individual ringed in Scotland and recovered in Sussex in January. In the migration to France and Spain there is a tendency for the juveniles to migrate more than the adults, but there is no such tendency in those migrating to Ireland. The proportion of individuals which respectively reside for the winter, migrate west to Ireland, etc., and migrate south to France and Spain differs markedly in different parts of Britain.

TABLE I.

NO. OF RETURNS OF BRITISH SONG-THRUSHES RINGED AS NESTLINGS.

<i>Place of Recovery</i> ...	<i>Where ringed (Oct.-Feb.)</i>			<i>Ireland</i>			<i>Other parts west</i>			<i>France, Spain, etc.</i>		
<i>Place of ringing</i> ...	Scotland and Borders	Northern England	Southern England	Scotland and Borders	Northern England	Southern England	Scotland and Borders	Northern England	Southern England	Scotland and Borders	Northern England	Southern England
1st winter ...	6	5	21	18	4	2	3	3	5	3	6	12
Later winters	13	11	20	28	6	—	—	2	1	2	—	2

Also one ringed in Scotland and recovered in Sussex.

TABLE II.

RELATION OF AGE TO MIGRATION IN SONG-THRUSH.

<i>Place of recovery</i>	<i>Total No. found</i>	<i>% in first winter</i>
Where ringed... ..	76	42
Ireland	58	41
France, Spain, etc.	25	84

TABLE III.

REGIONAL DIFFERENCES IN MIGRATION OF SONG-THRUSH.

<i>Place of ringing</i>	<i>Total No. found</i>	<i>Percentage of birds wintering</i>			
		<i>Where ringed</i>	<i>Ireland</i>	<i>Other parts west</i>	<i>France, Spain, etc.</i>
Scotland and Borders ...	74	26	62	4	7
Northern England	37	43	27	14	16
Southern England	63	65	3	10	22

Table II shows that the proportion of first-year birds recovered is the same among those which winter where ringed and those which migrate west to Ireland. On the other hand, among those which migrate south to France, Spain, etc., the proportion of first-year birds recovered is considerably higher. (It also appears to be higher in those moving west but not reaching Ireland, but so few such individuals have been recovered that this question should be re-investigated when more returns are available).

Table III shows that the proportion of resident Song-Thrushes is much higher in the southern than the northern parts of Britain. The proportion which migrate south to France and Spain is also higher in southern than northern Britain. On the other hand the proportion which migrate west to Ireland is greatest in the north and least in the south of Britain.

STARLING (*Sturnus v. vulgaris*).

Among British Starlings most are resident, a small proportion, chiefly from northern Britain, migrate west to Ireland, one has been recorded migrating south to France. As in other species, only those ringed as nestlings are recorded in the tables. Of 19 others trapped as juveniles in late July and August in northern England (and probably hatched there) one went to Ireland. Bullough (1942) is

too sweeping when he says that migration is entirely lacking in the British Starling, but the latter is certainly much less migratory than the Continental Starling.

TABLE IV.

NO. OF RETURNS OF BRITISH STARLINGS RINGED AS NESTLINGS.								
<i>Place of recovery</i> ...	<i>Where ringed (Oct.-Feb.)</i>			<i>Ireland</i>		<i>Other parts west</i>		<i>France</i>
<i>Place of ringing</i> ...	Scotland and Borders	Northern England	Southern England	Scotland and Borders	Southern England	Southern England		Southern England
1st winter ...	11	5	23	6	1	3		1
Later winters ...	26	8	21	1	1	—		—

TABLE V.

REGIONAL DIFFERENCES IN MIGRATION OF STARLING.					
<i>Place of ringing</i>	<i>Total No. found</i>	<i>Percentage of birds found</i>			
		<i>Where ringed</i>	<i>Ireland</i>	<i>Other parts west</i>	<i>France</i>
Scotland and Borders ...	44	84	16	—	—
Southern England	50	88	4	6	2

PIED WAGTAIL (*Motacilla alba yarrellii*).

In the Pied Wagtail more individuals migrate south to France, Spain and Portugal than remain to winter where ringed. The figures are exceedingly small, but they fit the view that a relatively greater proportion of first-year individuals migrate. There is no evidence of a winter movement west to Ireland, but the returns are as yet very few and, as some individuals migrate to south-western England, it seems not unlikely that others go to Ireland.

TABLE VI.

NO. OF RETURNS OF PIED WAGTAILS RINGED AS NESTLINGS.								
<i>Place of recovery</i> ...	<i>Where ringed (Oct.-Feb.)</i>			<i>S.W. England</i>	<i>France, Spain, etc.</i>			
<i>Place of ringing</i> ...	Scotland and Borders	Northern England	Southern England	Scotland and Borders	Scotland and Borders	Northern England	Southern England	
1st winter ...	2	—	2	2	3	4	7	
Later winters ...	—	—	3	—	2	—	—	

One ringed in Perthshire and recovered in its second October in Yorkshire is omitted as it might have been either a resident which had shifted or a migrant *en route* south.

TABLE VII.

RELATION OF AGE TO MIGRATION IN PIED WAGTAIL.			
<i>Place of recovery</i>	<i>Total No. found</i>	<i>% in first-year</i>	
Residents—where ringed ...	7	57	
Migrants—France, Spain, etc. ...	16	88	

BLACKBIRD (*Turdus m. merula*).

The migration of British Blackbirds is similar to that of Song-Thrushes except that hardly any migrate south to France and Spain. In addition to the one individual recorded in Table VIII, a second individual ringed as an immature bird in early August in Lincolnshire also went to France. But, though highly probable, it is not certain that this bird was hatched in Britain, so it is excluded.

First-year individuals are no commoner among those migrating west to Ireland than they are among residents. The proportion which migrate to Ireland is highest in Scotland and the Borders, and lowest in southern England. A smaller proportion of Blackbirds migrate to Ireland than is the case in the Song-Thrush.

TABLE VIII.

NO. OF RETURNS OF BLACKBIRDS RINGED AS NESTLINGS.

Place of recovery ...	Where ringed (Nov.-Feb.)			Ireland			Other parts west	France
Place of ringing ...	Scotland and Borders	Northern England	Southern England	Scotland and Borders	Northern England	Southern England	Scotland and Borders	Southern England
1st winter ...	21	10	25	8	4	1	1	1
Later winters ...	23	5	27	15	1	1	1	—

TABLE IX.

RELATION OF AGE TO MIGRATION IN BLACKBIRD.

Place of recovery	Total No. found		% in first winter
Residents—where ringed	111	50
Migrants—to Ireland	30	43

TABLE X.

REGIONAL DIFFERENCES IN MIGRATION OF BLACKBIRD.

Place of ringing	Total No. found	Where ringed	Percentage of birds found		
			Ireland	Other parts west	France, Spain, etc.
Scotland and Borders ...	69	64	33	3	—
Northern England	20	75	25	—	—
Southern England	55	95	4	—	1

ROBIN (*Erithacus rubecula melophilus*).

In the British Robin a small proportion migrate south to France, and since 1936 one more individual ringed in southern England has been recovered in France. I have shown elsewhere (Lack, 1940, 1943b) that most of those which migrate are females. There is no evidence from the ringing returns that Robins breeding in Scotland or England migrate to Ireland, but the number of returns is too small for this possibility to be excluded. Ticehurst (*loc. cit.*) summarises evidence for autumn movements on the Irish coasts.

TABLE XI.

NO. OF RETURNS OF BRITISH ROBINS RINGED AS NESTLINGS.

Place of recovery				Where ringed (Sept.-Feb.)		France, etc.
Place of ringing				Scotland and Borders	Northern England	Southern England
1st winter	...	...	...	16	7	25
Later winters...	...	...	...	4	3	5

2. WADERS.

LAPWING (*Vanellus vanellus*).

The data for the Lapwing are more complete than for other waders, as in the case of the Song-Thrush amongst the Passerines. The position in the present species is extremely similar to that found in the Song-Thrush. The birds either winter close to where ringed, or move west to Ireland, with a few to S.W. Wales, Cornwall and S.W. Devon, or move south to France, Spain and Portugal. None migrate to winter intermediately in south-eastern and southern England. In those migrating to France, Spain, etc., there is a tendency for the juveniles to migrate more than the adults, but there is no such tendency among those migrating to Ireland. The proportion which move to Ireland is highest in the north and lowest in the south of Britain, while the proportion which move south to France, Spain, etc., is highest in the south of England and lowest in the north. Hence the statement by Ticehurst (*loc. cit.*) that the migration of this species is irrespective of either age or breeding area is partially incorrect. It is true that not all individuals of the same age or in the same breeding area behave in the same way, but the proportion showing each type of behaviour depends on both age and breeding area.

TABLE XII.

NO. OF RETURNS OF LAPWINGS RINGED AS YOUNG.

Place of recovery	Where ringed (Nov.-March)				Ireland				Other parts west				France. Spain, etc.			
Place of ringing	Scotland	Borders	Northern England	Southern England	Scotland	Borders	Northern England	Southern England	Scotland	Borders	Northern England	Southern England	Scotland	Borders	Northern England	Southern England
1st winter..	12	9	19	4	54	16	7	1	3	—	—	—	24	20	14	11
Later winters	29	18	17	11	104	50	17	2	7	—	6	1	12	10	13	18

TABLE XIII.

RELATION OF AGE TO MIGRATION IN LAPWING.

Place of recovery		Total No. found	% in first year
Residents—where ringed	...	119	37
Migrants—Ireland	...	251	31
Migrants—Other parts west	...	17	18
Migrants—France, Spain, etc....	...	122	57

TABLE XIV.

REGIONAL DIFFERENCES IN MIGRATION OF LAPWING.

Place of ringing	Total No. found	Percentage of birds wintering			
		Where ringed	Ireland	Other parts west	France, Spain, etc.
Scotland... ..	245	17	64	4	15
Borders	123	22	54	—	24
Northern England	93	39	26	6	29
Southern England	48	31	6	2	60

CURLEW (*Numenius a. arquata*).

The returns of birds ringed in Scotland and northern England are grouped together. Most Curlew migrate to Ireland for the winter; quite a large number are resident. In those migrating to Ireland there is no tendency for the juveniles to migrate more than the adults. Of those ringed up to 1936 none have been recovered abroad, but one ringed in 1937 was recovered in Spain in its first winter.

TABLE XV.

NO. OF RETURNS OF CURLEW.

(RINGED AS YOUNG IN SCOTLAND AND N. ENGLAND).

Place of Recovery ...		Where ringed (Sept.-March)	Ireland	Other parts west
1st winter ... ..	...	15	33	2
Later winters	...	6	20	—

TABLE XVI.

RELATION OF AGE TO MIGRATION IN CURLEW.

Place of recovery			Total No. found	% in first year
Residents—where ringed	...	...	21	71
Migrants—Ireland	...	...	53	62

WOODCOCK (*Scolopax rusticola*).

The returns of birds ringed in Scotland and northern England are grouped together. Most Woodcock are resident for the winter; some migrate west to Ireland, etc., and a few south to France and Spain. Among those migrating to Ireland there is no tendency for the juveniles to migrate more than the adults. There are as yet very few returns from France and Spain, but these are not inconsistent with the view that the juveniles migrate there more than the adults.

TABLE XVII.

NO. OF RETURNS OF WOODCOCK.

(RINGED AS YOUNG IN SCOTLAND AND N. ENGLAND).

Place of recovery ...		Where ringed (Nov.-Feb.)	Ireland	Other parts west	France, Spain, etc.
1st winter ... ..	...	99	24	7	8
Other winters	...	88	25	2	4

TABLE XVIII.

RELATION OF AGE TO MIGRATION IN WOODCOCK.

<i>Place of recovery</i>	<i>Total No. found</i>	<i>% in first year</i>
Residents—where ringed	187	53
Migrants—Ireland	49	49
Migrants—France, Spain, etc....	12	67

3. SEA-BIRDS.

BLACK-HEADED GULL (*Larus r. ridibundus*).

The migration of this species forms a marked contrast with that of Song-Thrush, Lapwing or the other species so far considered. Firstly, there is no clear line between "residents" and "migrants." In winter the birds are recovered at varying distances from the breeding grounds, though usually south of them, and local wandering cannot be distinguished from migration proper. Secondly, among those migrating there appears to be no tendency to divide into two separate movements, one west to Ireland and the other south to France, Spain and Portugal. While birds migrate to winter in both these directions, others are found intermediately in southern and eastern England. In short, there is simply a general drift southward in winter.

In Tables XIX and XX are analysed the returns of Black-headed Gulls ringed as young in northern England and southern Scotland. The recoveries of young ringed in southern England are too few to permit analysis and are omitted. Birds recovered north of the Wash between October and March have been classified as "residents," those recovered south of the Wash as "migrants." There being no clear separation between residents and migrants, the position of this line is necessarily arbitrary. The seasonal limits are also somewhat arbitrary. The drift south begins considerably before October, particularly, apparently, among first-year birds. But since other individuals do not move south till later, one cannot classify as residents individuals recovered north of the Wash before October. To provide comparable resident to migrant ratios, it then becomes necessary to omit also those migrants recovered before October. For reasons given in the paper on the age of birds (Lack, 1943 (a)), it is necessary to exclude the recoveries of individuals shot.

TABLE XIX.

NO. OF RETURNS OF BLACK-HEADED GULLS OCTOBER-MARCH.

(RINGED AS YOUNG IN NORTHERN ENGLAND AND SOUTHERN SCOTLAND AND OMITTING THOSE SHOT).

<i>Place of recovery</i>	<i>...</i>	<i>Britain north of Wash</i>	<i>England south of Wash</i>	<i>Ireland</i>	<i>France, Spain Portugal, N.W. Africa</i>
1st winter	...	29	11	7	6
Later winters	...	58	14	5	5

TABLE XX.

RELATION OF AGE TO MIGRATION IN BLACK-HEADED GULLS.

<i>Place of recovery</i>	<i>Total No. found</i>	<i>% in first year</i>
Residents—north of Wash	87	33
Migrants—all south of Wash	48	50

The figures indicate a tendency for the juveniles to migrate more than the older individuals, and that this is true not only for those migrating to France, Spain and Portugal, but also for those migrating to Ireland and to the south of England. The latter was also to be expected on general grounds, as the migration is generally southward and is not, as in Song-Thrush and Lapwing, divided into two separate movements, one south and the other west.

Counts of all the Black-headed Gulls seen in Orkney on October 3rd and 4th, 1942, gave ten in immature plumage in a total of 122—or only 8 per cent. From this it is clear that relatively more juveniles than adults migrate south from Orkney in winter. Counts in the London Parks round December 1st, 1942 gave 47 in immature plumage out of 1,050 counted—or about 4½ per cent. Ringing returns have shown that a number of the Black-headed Gulls wintering in London have come from the Continent of Europe, and so it is difficult to interpret the significance of the ratio of juveniles to adults in London without further information. But presumably it means that the bulk of the juveniles winter further south. Miss E. P. Leach informs me that the proportion of immature birds is less than in pre-war years, perhaps because many more eggs are taken for food.

GANNET (*Sula bassana*).

Landsborough Thomson (1939) has shown that among the Gannets nesting in Britain many first-year birds migrate, some second-year birds migrate, but not usually so far south as the first-year birds, while the small number of returns of adults showed no evidence of migration. The migrants disperse generally southward. In Orkney and Shetland waters between October 1st and 4th, 1942, I saw large numbers of adult Gannets but very few in immature plumage, thus confirming that it is primarily the immature birds which migrate, but actual counts were not taken.

CORMORANT (*Phalacrocorax c. carbo*).

The ringing returns show that of the Cormorants nesting in Scotland some stay the winter near where ringed, while others disperse southward in various directions, to Ireland, southern England, France and Spain. The returns are insufficient to determine whether or not the juveniles migrate more than the adults.

KITTIWAKE (*Rissa t. tridactyla*).

In Orkney between October 1st and 4th, 1942, I saw many hundreds of adult Kittiwakes, but not a single juvenile bird. Presumably the latter were mainly further south. The ringing returns for first winter birds are too few to check this surmise.

(To be continued).



REED-WARBLERS AT NEST.

Female passing food to male: after receiving the food the male passed it on to the young.

(*Photographed by Eric J. Hosking.*)



REED-WARBLERS AT NEST.
Male swallowing small faecal sac.



REED-WARBLERS AT NEST.
Male pushes female to one side while he feeds young.

A PAIR OF REED-WARBLERS

BY

ERIC J. HOSKING AND STUART G. SMITH, B.Sc., Ph.D.

(Plates 5 and 6.)

IN a recent and stimulating article, Ryves (*antea*, pp. 10-16), has drawn attention to the need for careful and precise investigation into the rôle of male birds during incubation. He has pointed out that the mere presence of a cock bird on the nest does not necessarily mean that it is incubating in the sense that the covering of the eggs is contributing to the immediate development of the embryo, and this point has received a certain amount of physiological backing (albeit somewhat circumstantial) from the literature of experiments on the temperature under incubating birds, and especially at the brood-spots (Tucker, *antea*, pp. 22-28). The subject is one on which our knowledge is admittedly rudimentary, and the need for care before jumping to conclusions is admirably shown by the observations of Workman (*antea*, pp. 79-80) on an aviary pair of Californian Quail (*Lophortyx californica*), where the male of a species which normally "never incubates" (Workman) undertook the incubation and successful hatching of a clutch of eggs after the death of the female. Further light will only be shed on the subject by the most careful and detailed observations of field workers, and during the past breeding-season we were fortunate in being able to carry out such observation on a pair of Reed-Warblers (*Acrocephalus s. scirpaceus*), not only during the incubation of the eggs but also during the feeding of the young. We can state at once that not only did the male belong to the category 2 of Ryves, but further the functions of the male and female were so interchangeable right through the incubation and feeding periods that, apart from small differences such as song, the two birds reacted and behaved in an identical manner.

The nest was found after the full clutch of four eggs had been completed, and hence, unfortunately, we were unable to determine such points of interest as the share of the sexes in site-selection, nest construction, and the behaviour of the male during the completing of the clutch. Watching began on June 6th, when one of us (S.G.S.) occupied a hide, placed before the nest, for about four hours during the middle part of the day. The first bird to return was the hen, who came back at once, worked the eggs beneath her, and commenced to incubate, sitting very low with only head and tail showing. Exactly a quarter of an hour later the cock approached through the reeds, singing as he came. He perched on a reed immediately above the nest, when the hen raised herself from the eggs, shivered her wings, answered the cock with a harsh "churring" note and then left at once. The cock flew down to the nest and in an identical manner to that of the hen, worked the eggs beneath him and proceeded to incubate. After a few

minutes he raised himself, deliberately turned the eggs with his bill, settled down again, and proceeded to *sing vigorously whilst still on the eggs*. He sang snatches of song until relieved by the hen, after about 20 minutes of incubation. The hen approached the nest, uttered the "churr, churr" note that she used when quitting it, when the cock sang a snatch of song in reply, sidled off the nest, and the hen proceeded to incubate. This behaviour was continuous and typical, the remarkable thing being the comparatively short periods that each bird spent on the nest. Thus from the diary of one of us (S.G.S.) the following is representative of notes taken on the spot:—

"1.7 p.m. (D.S.T.) ♂ arrives, sings in the reeds about 10 yards from the nest—the ♀ grows agitated, raises herself on the nest, ruffles her feathers, answers the ♂'s song with a harsh low "churr." She then leaves and the ♂ comes on still singing. He works the eggs beneath him and settles down puffed out and contented. Occasionally he sings a snatch of song; 1.15 p.m. the ♀ returns; the ♂ leaves the nest whilst she is still some yards away, returns before she reaches it, sits on the nest and sings loudly until the ♀ flies to one of the reeds supporting the nest, when he leaves at once and the ♀ incubates; 1.34 p.m. another identical change-over; 1.45 p.m., another; 1.54 p.m., yet another!"

During one period when the hen was on the nest, a Sedge-Warbler (*Acrocephalus schænobæmus*) perched on the reeds above. The hen immediately rose from the eggs and attacked the bird most violently with the raised and puffed feathers of a threat display. On another occasion the cock reacted in an identical manner to another Sedge-Warbler (or possibly the same bird) which passed through the reed bed near the nest.

On the following day, our friend John Markham spent a considerable time in the hide and reported that the cock and hen birds were still changing place every quarter of an hour and that the cock sang vigorously on the nest. On June 14th the eggs hatched, and on the 15th, one of us (E.J.H.) commenced a period of intensive watching and photographic recording. The following are the main points of the behaviour of the male and female birds during the fledging period. Both the male and female brooded the small young on the nest for approximately equal periods; the average time being about a quarter of an hour (*cf.* similar period during incubation). During heavy rain, both cock and hen, whichever was brooding the young, sheltered them by spreading their wings over the nest. In a cycle of visits, the following is typical. The cock approached the nest with food, warbling as he came, the hen brooding the young. She raised herself slightly and commenced to quiver her wings, opening her mouth widely and begging for food. The cock passed her about one-half of the total catch, pushed her to one side of the nest, and fed the rest of the food to the young.

The cock then went to the edge of the nest, when the hen leant forward and fed the food given to her by the cock, to the young. One chick defecated after prodding and tugging by the hen, and she carried off the faecal sac. The cock then brooded the young. Some minutes later, the hen returned, approaching silently. The cock raised his crest as soon as he saw her, opened his beak, and begged for food precisely as did the hen, with the exception that the crest-raising took the place of the wing-shivering. The hen bird gave him part of the food (see Plate 5), passed the rest to the young under his raised body, and then left. The cock then fed the young with the food passed to him by the hen, stimulated the young for defecation and carried away the resultant excrement.

We are here presented, then, with a remarkable interchangeability of the sexes with respect to incubation, defence of nest area, mode of brooding and protecting the young, method of feeding the young, and nest-sanitation. Apart from the singing of one of the pair, and the fact that one received food with raised crest whilst the other shivered its wings, absolute duplication of behaviour and function were present. The amazing rhythm and interchangeability of this pair of Reed-Warblers may prove to be atypical, but this can only be established by further continuous watching at other nests of this species. The pertinent question "Is it incubation or merely brooding" asked by Ryves is but one of the many questions about the relations of the sexes during the breeding phase which need to be widely answered, and such answering will only come from an extensive working out of the intimate behaviour of breeding birds with special attention to many small but important details.

NOTES.

GREENFINCH ADAPTING BULLFINCH'S NEST.

IN *British Birds* (Vol. xxxvi, p. 94), I have previously recorded an adaptation of a Blackcap's (*Sylvia a. atricapilla*) nest by Hedge-Sparrows (*Prunella m. occidentalis*) so that the following case, of which Mr. G. S. Eustace has sent me details, may also be worth recording.

On June 25th, 1943, a Bullfinch's (*Pyrrhula p. nesa*) nest was found containing five eggs. On inspecting the nest again two days later, the eggs were found to be deserted and were taken, though the nest itself was undisturbed. It was looked at again on August 7th and was found to contain four young Greenfinches (*Chloris c. chloris*); the hen was also seen nearby.

The nest was removed after the Greenfinches had fledged, and is now in my possession. The original materials used by the Bullfinches remain, but a little moss, a few bents, and a number of what I believe to be Wood-Pigeon (*Columba p. palumbus*) feathers had been added to the interior of the nest by the Greenfinches.

P. A. ADOLPH.

[Mr. Adolph has kindly submitted the nest to me and I can confirm the account given.—B. W. T.]

PIED FLYCATCHER BREEDING IN FLINTSHIRE.

THE *Handbook* map showing the breeding distribution of the Pied Flycatcher (*Muscicapa h. hypoleuca*) does not include Flintshire in the N. Wales breeding area. In one wood examined near Mold this year at least four pairs were resident and two nests were examined.

J. LORD.

PIED AND RED-BREASTED FLYCATCHERS
IN GLAMORGAN.

ON the morning of August 8th, 1943, on the northern outskirts of Cardiff, I encountered a mixed band of small migrants. There were scores of Willow-Warblers (*Phylloscopus t. trochilus*), a few Chiffchaffs (*Phylloscopus c. collybita*), about a dozen Spotted Flycatchers (*Muscicapa s. striata*) and a solitary Pied Flycatcher (*Muscicapa h. hypoleuca*), which was hawking insects from the top rail of a fence around a lake. There are only seven previous records of the Pied Flycatcher in the county, the first in 1888 and the last in 1934, and all these relate to the spring passage; the above is the first autumn record.

On September 12th, 1943, along a hedge adjoining Llanishen Reservoir, I was once again fortunate enough to find a similar but considerably smaller band, consisting of—amongst others unidentified—two or three Spotted Flycatchers, several Willow-Warblers, a Whitethroat (*Sylvia c. communis*) and a bird which I thought at first was a Lesser Whitethroat (*Sylvia c. curruca*) until I saw it in flight, which was characteristically that of a Flycatcher.

Between flights it kept to the middle of the hedge and when it darted out in pursuit of insects—which it invariably did on the opposite side of the hedge to me—I once or twice caught sight of a flash of white about the tail. I got fairly close to it several times as it sat in the hedge. It always sat facing me, against the dull light, opening and preening its wings once or twice. As a Spotted Flycatcher and a Willow-Warbler came near it on one occasion, I was able to see that it was smaller than the former and about the same size as the latter. At rest it had something of the pose and appearance of a Pied Flycatcher, but there was no trace of white on its wings. All upper-parts, including wings, appeared to be mouse-grey with no spots or streaks or light feather edges; throat dusky-cream; lower neck and breast white without markings of any kind. Unfortunately its tail was lost in the deep shadows of the hedge, but having caught a sight of white there as it flew, I was certain it could only be a female Red-breasted Flycatcher (*Muscicapa p. parva*), a new species for the county and for Wales.

I have seen more Flycatchers on passage in South Wales this autumn than ever before in my experience.

GEOFFREY C. S. INGRAM.

DARTFORD-WARBLE IN CAERNARVONSHIRE.

ON perusal of the notes on the distribution of the Dartford-Warbler (*Sylvia undata dartfordiensis*) in *The Handbook of British Birds*, I find that there is no record of a straggler further north than Staffordshire. In May, 1932 I observed an adult male for two days at Tremadoc in Caernarvonshire. The bird arrived after a severe S.W. gale in a large, partially unenclosed farmhouse garden, which opened on to a common and was for the most part uncultivated and covered with gorse. I first noted the bird through glasses, but subsequently was able to approach within a few yards. I am familiar with the species in its more southerly haunts, and the fact of this bird being an adult male in breeding plumage left no doubt whatever as to correct identification. The bird remained in the locality for two days and then disappeared. My field notebook for the year records that the notes which I took down at the time were a very hard metallic “tucc,” and a string of the same notes uttered together in a scolding fashion when I approached near enough to cause alarm.

DEREK C. BARBER.

BLACK WHEATEAR IN CHESHIRE.

MR. W. CULLEN sent me sketches, drawn on the spot before he had access to any book, of a wheatear at rest and in flight, which he observed at very close quarters in a cabbage field within half a mile of the Altrincham Sewage Farm, Cheshire, on August 1st, 1943. He described the bird in detail: entire plumage of a dull brownish-black except for a uniformly white rump and white tail which had a black fringe at the end and black centre feathers forming an inverted “T” (this was clearly shown in the sketch), head appeared to be

flat-topped, neck shortish, bill very dark, fairly long and pointed, legs black; it was particularly noted that breast and belly were of the same colour as head and back, and that the under tail-coverts were very light—almost white; length about that of a Greenfinch or Yellowhammer, but a much more stockily built bird. Mr. Cullen approached within five yards of the bird and it then flew to a cartshaft 20 yards distant, where it bobbed and curtsied in wheatear fashion.

From this evidence it seems clear that it must have been one of the forms of the Black Wheatear (*Enanthe leucura*), as Mr. Cullen suggested. Mr. B. W. Tucker, to whom I sent the original sketches and Mr. Cullen's letters, agrees that the evidence leaves no doubt that it was a bird of this species.

A. W. BOYD.

SPARROW-HAWK AND GROUSE.

ON Saturday, September 18th, 1943, at Farr, Inverness, were found a hen Sparrow-Hawk (*Accipiter n. nisus*) and an old Red Grouse (*Lagopus s. scoticus*) both dead and locked together. The talons of the left leg of the hawk were imbedded in the right breast of the grouse; this leg and the right wing of the grouse were doubly wound round one another, the joints almost exactly opposed and fully bent. Rigor was still present when found and the locking was rigid. The neck and head of the grouse were denuded of feathers, probably by the beating of the hawk's wing. The birds were lying in a small hole in the moor and there were signs of the struggle in the grass alongside the hole.

D. GILLESPIE.

[We have received a rough sketch of the birds from Dr. Stephen, of the Royal Scottish Museum, to which they were sent, though they proved to be too decomposed for preservation.—EDS.].

TEMMINCK'S STINTS IN HERTFORDSHIRE, ESSEX AND SOMERSET.

ON August 29th, 1943, I had excellent views of a Temminck's Stint (*Calidris temminckii*) at the Tring Reservoirs. I was able to compare it with a Little Stint (*C. minuta*), and the pattern of the upper-parts indicated that it was a bird of the year. This is the second record of the species for Tring and Hertfordshire and the first record for autumn, the only previous authentic occurrence in the county having been one observed at Tring in May, 1939 (*antea*, Vol. xxxiii, p. 54).

R. H. RYALL.

ON September 11th, 1943, we identified two Temminck's Stints (*Calidris temminckii*), believed to be adults, on a fresh marsh by the River Blackwater. They were associating with two Ruffs and two Reeves. The general colour of their backs was greyish-brown, definitely patterned, but less boldly than in an immature Little Stint (*C. minuta*) seen the week before on the open mud of the Estuary, and they were equally distinct from a Little Stint in summer plumage seen by one of us at Tring about a fortnight

before. The latter bird was a brighter brown colour and not greyish at all. When flushed the birds gave a soft trilling call quite distinct from the call of the Little Stint, with which we are familiar, towered rather like Green Sandpipers, and did not alight again within view. There appears to be no recent record of the occurrence of the species in Essex.

T. BISPHAM, J. R. MALLINSON.

At Barrow Gurney Reservoirs on September 12th, 1943, I disturbed from the water's edge a small wader which, from its flight and trilling call, I at once suspected to be a Temminck's Stint (*Calidris temminckii*). Subsequent close views, with 30x telescope, confirmed the identification and I was able to note the sandy-grey mantle with a few well defined black spots, the greyish breast and the bird's resemblance in carriage and behaviour to a Common Sandpiper in miniature. As it rose a second time the white outer tail-feathers were plainly visible. Leg coloration was altogether paler than is shown in most illustrations, and can best be described as drab-yellow or, to quote from *The Handbook*, "dirty yellowish." The bird was still present on the 19th when I had further opportunities of seeing it at close range.

H. H. DAVIS.

EARLY SUMMER PASSAGE OF TERNS.

It is stated in *The Handbook* that the return passage of the Common Tern (*Sterna h. hirundo*) dates from "end August to mid-October" and of the Arctic Tern (*Sterna macrura*) from "end August to second week in October," but this does not coincide with observations made on the South Lancashire coast. The main passage has usually been completed before the end of August, and July flocks have occasionally exceeded those seen in September. The largest flock I have seen at Ainsdale occurred on August 17th, 1919, and another great host was observed at Banks (Ribble estuary) on August 29th, 1921. This early passage is a normal occurrence on the S. Lancashire coast—I noted it as long ago as July 27th, 1916—and in assessing these arrivals care has been taken to exclude birds collecting on the beach from the local ternery. The following table shews dates of passage in recent years :—

	First Arrivals.	Peak Dates.	Main Passage ended.	Passage in flocks ended.	Last seen.
1938 ...	July 4	July 18	Aug. 16	Sept. 10	Oct. 14
1939 ...	July 17	Aug. 5-10	Sept. 8	Sept. 16	Sept. 27
1940 ...	July 20	Aug. 2-3	Aug. 9	—	Aug. 31
1941 ...	July 10	Aug. 2	—	—	—
1942 ...	July 15	—	no observa- tions	—	—

I must emphasise the difficulty in estimating the percentage of Common and Arctic terns in any large mixed flock, but on July, 15th, 1942, for the first time, Arctics predominated among the early immigrants. In 1943 terns arrived in force on July 7th, and by July 22nd there were 700-800 Arctic and Common Terns at Ainsdale. This July movement probably influences the passage of the Arctic

Skua (*Stercorarius parasiticus*); on July 16th, 1940 I saw Skuas at Ainsdale and there are other July records for this coast.

F. W. HOLDER.

During 1940 and 1941 I was able to visit the Red Rocks, Hoylake, Cheshire, at the mouth of the River Dee, 16 miles south of Ainsdale in a direct line across Liverpool Bay. My observations confirm F. W. H.'s far more regular notes and his conclusion that the terns' return passage, on the west coast at least, often begins six weeks earlier than the dates given in *The Handbook*.

In 1940 there were several hundred, the great majority Common Terns, on August 4th, a day later than the "peak" date at Ainsdale, but the date in that year of the greatest passage was September 5th, when the largest flock I have ever seen in Cheshire flew past Hoylake and settled on the sands near Hilbre Island. In 1941 on July 10th the date of the first arrivals at Ainsdale, there were about 60 Common Terns at Hoylake, about 400 on the 24th and 200-300 on July 31st. There were still 200-300 (including a few Arctic Terns) on August 30th, but none when I visited the place on September 27th.

Inland I occasionally see birds in October: Common or Arctic:—two on October 12th, 1929, five on October 12th and two on October 19th, 1930, one on October 28th, 1943; Common Tern:—one adult, October 15th and 16th, 1942, but these later occurrences are quite exceptional.

A. W. BOYD.

[While it is hardly possible to deny the correctness of the interpretation placed on the above records, that they represent the beginnings of emigration, it may be pointed out that the presence of the birds at the places and times cited can be equally well accounted for by the wandering and dispersal habit that apparently all terns indulge in prior to final emigration, which is referred to in *The Handbook* under both Sandwich and Common Terns.—EDS.]

CROSSBILLS IN GLAMORGAN.—Mr. J. Spalding informs us that a small party of Crossbills (*Loxia c. curvirostra*) visited Oxwich Point in the Gower Peninsula on September 21st, 1943. The species is only an occasional visitor to Glamorgan.

FIRECRESTS IN LANCASHIRE AND MIDDLESEX.—Mr. C. Oakes sends us details of a Firecrest (*Regulus i. ignicapillus*) which he observed at close quarters in hawthorns in the Cliviger Gorge, about three miles south-east of Burnley, Lancs, on September 9th, 1943, and Mr. W. R. Philipson reports one clearly identified by him in willows by Ruislip Reservoir, on September 18th, 1943. Both dates are exceptionally early for this species, which does not ordinarily reach this country till October. Firecrests have previously been seen at Ruislip in December, 1938 and November and December, 1941 (*antea*, Vol. xxxv, pp. 18 and 183).

RING-OUZEL IN KENT IN WINTER.—Paymaster Rear-Admiral Sir Henry Woodward informs us that on two consecutive days in December, 1942 several Ring-Ouzels (*Turdus t. torquatus*) were

feeding on berries on a hedge in his garden at Charing. It is noteworthy that the winter 1942-43 was the mildest for 30 years. For previous records, see *antea*, Vol. xvii, p. 308 and *South-Eastern Bird Report* for 1940.

OSPREYS IN DEVONSHIRE AND YORKSHIRE.—The Rev. J. L. Longstaff has sent us particulars of an Osprey (*Pandion h. haliaetus*) which he saw at Ilfracombe on June 10th, 1943. It was carrying a fish when observed. He was informed by an acquaintance that it had been in the neighbourhood for some weeks and was occasionally to be seen fishing off the coast. Mr. C. Oakes also reports an Osprey of which he had good views near Great Mytton in the West Riding of Yorkshire a short distance above the confluence of the Hodder and the Ribble on September 19th, 1943. The Yorks-Lancs border is here formed by the two rivers, but the bird was not actually observed to cross to the Lancashire side of either.

THE HYLANDS HERONRY, ESSEX.—With reference to the note under the heading "Unrecorded Heronry in Essex" (*antea*, p. 100) Mr. W. E. Glegg has kindly pointed out that this colony has in fact been recorded. It was unfortunately overlooked that particulars about it have been given by Mr. Glegg in the *Essex Naturalist*, Vol. xxv, pp. 51-2 in a supplementary note to his paper on "The History of Essex Heronries" (Vol. xxxiv, pp. 254-265).

RED-CRESTED POCHARDS IN LEICESTERSHIRE.—Messrs. Oliver Holmes and J. P. Paige have sent us details, together with an excellent water-colour sketch, of three drake Red-crested Pochards (*Netta rufina*), which they observed on September 30th and October 2nd, 1943, at Stanford Reservoir, South Kilworth, Leicestershire. The species has not previously been recorded in the county, but unfortunately all examples seen in recent years are under considerable suspicion of being strays from ornamental waters, notably from Woburn.

BLACK-TAILED GODWIT IN CAERNARVONSHIRE.—Mr. T. Bispham informs us that he saw a Black-tailed Godwit (*Limosa l. limosa*) on the beach in Morfa Nevin Bay on August 18th, 1943. For other records from North Wales, where the species is rarely recorded, see *antea*, Vol. xxxvi, p. 118.

UNUSUAL NUMBER OF LITTLE STINTS IN GLOUCESTERSHIRE.—Mr. H. H. Davis informs us that he and Mr. A. C. Leach saw 15 Little Stints (*Calidris minuta*) at Severn Beach on September 5th, 1943. It is exceptional for such a number of this species to be seen anywhere on the Severn Estuary or Bristol Channel coasts.

BLACK-HEADED GULLS NESTING IN SHROPSHIRE.—With reference to Mr. A. W. Bolt's record of breeding at Buckton in 1943 (*antea*, p. 100) Mr. W. F. Ireland informs us that in August, 1942, he visited the site of a small colony on a pool some three miles on the Shrewsbury side of Church Stretton, on the top of the Long Mynd. The birds had been seen by a friend of his earlier in the year flying in and out of the reed tufts on the pool, and although they had left by the date of Mr. Ireland's visit he saw the unmistakable nests.

LETTERS.

FULMARS IN DORSET.

To the Editors of BRITISH BIRDS.

SIRS.—As one of the organizers of the recent inquiry into the status of the Fulmar (*Fulmarus glacialis*) conducted by the British Trust for Ornithology, I was interested to read the note in your October number (*antea*, p. 98) on the status of this bird in Dorset.

The collection of information about the Fulmar, by the Trust, still continues, and we have a good deal of material which has come in since the publication of the Trust's report (*Journal of Animal Ecology*, Vol. x, pp. 204-272).

Among this material is further evidence of the presence of Fulmars, in summer, on the south coast of England, as follows :—

NEEDLES, ISLE OF WIGHT.

In 1942 Mr. Brian Vesey-Fitzgerald saw two Fulmars flying along the cliff by the Needles on July 5th; on July 12th. four were flying along the cliff between the Needles and St. Catherine's. All birds were soaring along the edge of the cliffs, and were not seen going in to the cliff or visiting potential nest-sites.

START POINT, SOUTH DEVON.

On April 30th, 1943, Mr. David Lack saw "two Fulmars circling cliffs in usual pre-nesting fashion." Later, he writes "the Fulmars cleared off from Start, and were not there throughout May, but were certainly cliff-visiting before this."

Hence Mr. Gooch's valuable record of Fulmars prospecting nest-sites on a Dorset cliff in 1943 is not quite the first record of Fulmars on the south coast of England in summer.

The Trust's report on the Fulmar was published in 1941, and summarized the spread of the Fulmar up to 1939. The limitations of this remarkable spread were discussed, and on p. 258 we wrote :—"We shall soon know whether the 60°F. July isotherm is an important barrier; the test will be whether or not the Fulmar arrives on the cliffs of the Isle of Wight, or establishes itself on those of north-west France." We now know that the Fulmar has turned the corner of the West Country, and is prospecting the south coast of England in several places, including the Isle of Wight. Let us hope we shall soon be able to get evidence from France.

JAMES FISHER.

KITTIWAKES NESTING IN GLAMORGAN.

To the Editors of BRITISH BIRDS.

SIRS.—I read Major Calvert's note on the above (*antea*, p. 118), with considerable interest.

Although this species is supposed to have bred on Worms Head a great many years ago, no definite record can be traced, and records of its appearance there during the breeding season were few. Colonel H. Morrey Salmon and I had visited the Head on many occasions, but it was not until June 17th. 1928, that we found a party of 20-30 Kittiwakes present for the first time. As there were no signs of their nesting we paid a special visit on July 8th, when the birds had increased to 50-60, many immature with a number of apparently adult.

Since that date, and up to the outbreak of war, a few have been seen there in most years during the breeding season, but there was no sign of them nesting. It is therefore very satisfactory to know that one or two pairs have at last established themselves, and it is to be hoped that their numbers will increase.

GEOFFREY C. S. INGRAM.

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HARRY FORBES WITHERBY

(1873-1943)

It is with the most profound regret that we have to inform our readers of the death on December 11th of Mr. H. F. Witherby, the founder and editor of our journal, after an illness of several months. The loss to our science which his death entails would be impossible to exaggerate. By his founding and editing of this journal, by his organization of the ringing scheme, which was for so long run in connexion with *British Birds*, and most of all as the originator, editor and chief author first of the *Practical Handbook of British Birds* and lately of the new *Handbook*, not to mention his own important researches and many other services to our subject, he contributed more than any other single man in modern times to the advancement of the study of British birds. For many years he had been its acknowledged leader and had come to represent and almost, as it were, to personify British Ornithology in a unique way. His great knowledge, excellent judgment and the extreme care and accuracy of all his work have been an inestimable asset to the study of birds in this country, and a wide circle of correspondents, extending far beyond those who knew him personally, has reason to be grateful for these qualities.

While deploring his loss we may be thankful for a life so fruitful in the advancement of our science and for the fact that he lived to see the culmination of his work in *The Handbook* and the enthusiasm with which it was received by ornithologists everywhere. We cannot speak more fully here of his life and work, but it is hoped to publish a full notice in the next number.

Meanwhile, we are sure our readers, whether they had the privilege of knowing him personally or not, will wish to join us in offering our deep sympathy to Mrs. Witherby and his family in their great loss.

N.F.T.
B.W.T.

THE PROBLEM OF PARTIAL MIGRATION

BY

DAVID LACK.

(Concluded from page 130.)

RELATION OF AGE AND SEX TO MIGRATION.

The preceding analysis shows that in those British breeding species in which some individuals are resident for the winter while others migrate south, a greater proportion of the first-year than the older birds migrate. This holds for Song-Thrush, Lapwing, Black-headed Gull, Gannet, and probably for Pied Wagtail, Woodcock and Kittiwake, while no exceptions were found. Nice (1937) summarises evidence that the same holds on the Continent of Europe for tits, woodpeckers, Blackbird, Common Buzzard (*Buteo buteo*) and Sparrow-Hawk (*Accipiter nisus*), where it has also been claimed to hold for Chaffinch (*Fringilla cœlebs*) (Niethammer, 1937) and Robin. Eaton (1933) finds that among the Herring-Gulls (*Larus argentatus*) of eastern North America the first-year birds make long migrations, the second-year birds make shorter migrations and the adults do not migrate. To sum up, in all those partially migratory species in which the question has so far been investigated, the first-year birds migrate more than the adults.

In the British Robin many more females than males migrate. The relation of sex to migration has not been investigated for any other British species. But Nice (1937) summarises evidence that more females than males migrate in Chaffinch and Blackbird on the Continent of Europe and in Song-Sparrow (*Melospiza melodia*), Mocking-bird (*Mimus polyglottos*), Cabanis' Woodpecker (*Dryobates villosus hyloscopus*) and Prairie Chicken (*Tympanuchus cupido americanus*) in North America. Schäfer and de Schaunsee (1939) found the same to be true of Gtildenstadt's Redstart (*Phœnicurus erythrogaster*) in Tibet. In all those partially migratory species so far investigated, females migrate more than males. Parallel behaviour is quoted by Morley (1943) for the purely altitudinal migration of the British Red Grouse (*Lagopus scoticus*) and Himalayan Impeyan Pheasant (*Lophophorus impeyanus*), in both of which the females descend lower than the males.

Among species which are completely migratory, little evidence is available in regard to possible sex and age differences. But Nice (1937) states that in general females tend to winter further south than males of the same species. Also, in migratory song-birds the males usually arrive in spring ahead of the females, and the adult males ahead of the first-year males, the latter being noted by Gätke (1895) on Heligoland and recently confirmed through ringing returns for the Song-Sparrow by Nice (1937), and for the House-Wren (*Troglodytes ædon*) by Kendeigh (1941). Also, in a number of Limicoline species which breed in the arctic regions, immature birds in their first summer tend not to complete their migration

north, and ringing returns show that the same holds for the British Lesser Black-backed Gull (*Larus fuscus graellsii*).

The above facts all point to the same conclusion, that female and juvenile birds have a stronger tendency than the adult males to migrate to and continue longer in their winter quarters, and that the adult males have a stronger tendency than the females and juveniles to migrate to and continue longer in their breeding quarters.

The question of whether the sex hormones affect the migratory urge has been disputed since Rowan (1926) first enunciated the idea, and recently Wolfson (1940) has shown the problem to be very complex. But the above facts strongly suggest that male sex hormone is one factor, though perhaps only a subsidiary one, affecting the migratory urge, since the presence of male sex hormone is presumably the chief way in which the adult males on the one hand differ from the females and juveniles on the other. It is therefore suggested that the presence of male sex hormone may initiate or accelerate the spring migration north and prevent or retard the autumn migration south. This, of course, is purely tentative until it can be checked by experiment.*

SEXUAL BEHAVIOUR IN AUTUMN.

Particularly in the Robin, but to a less marked extent in many other British species, there is a partial recrudescence of spring breeding behaviour in autumn, and the same also holds in various North American birds. A revival of song is the most prominent feature, but fighting and territorial behaviour occur in Robin and Blackcock (*Lyrurus t. britannicus*), in Britain (Lack, 1939); and in the Mocking-bird in America (Michener, 1935). Howard (1907-14) observed not only song but much chasing in British warblers in the autumn, when I have observed a Chiffchaff (*Phylloscopus collybita*) which not only sang and chased other birds, but even copulated with a stuffed Robin. Brewster (1898) observed copulation and the abortive gathering of mud among three species of North American Swallows in autumn. Finally, among many species there are sporadic records of actual breeding in autumn.

The autumn song and territorial behaviour of such birds as Robin and Mocking-bird is very definite, yet it seems to have no function (Lack, 1939, 1943b), especially when it is remembered that some of the females of these species adopt male behaviour in autumn, as also do some female Starlings (Bullough and Carrick, 1940). There remains the possibility that this behaviour has some correlated advantage of a different nature.

In a number of species in which migration is either lacking or only partial among the individuals breeding in Britain, a greater proportion or all individuals migrate on the Continent of Europe. It seems probable that the non-migratory habit of the British birds is secondary, and has been evolved from a previous migratory

*Wolfson's latest paper, *Condor*, Vol. xliv, pp. 237-263 proves that increased daylength is a stimulus to spring migration in Juncos. But the whole subject is very complicated and a number of physiological factors are involved.

habit, presumably because those individuals which wintered in Britain have survived as well as, or rather better than, those which migrated. In the latter event any factor inducing the birds to stay for the winter rather than migrate would have survival value. It was suggested in the preceding section that the secretion of male sex hormone in autumn might retard or inhibit autumn migration. For this reason Dr. Bullough and the present writer have independently of each other arrived at the suggestion that the marked but apparently purposeless recrudescence of song and fighting in Starling and Robin in Britain in the autumn may be correlated with the secretion of male sex hormone at this season, this having survival value in inhibiting the southward migration. This view is supported by the fact that in Robin, Mocking-bird and Starling some of the females which, like males, do not migrate, further resemble males in that they sing and take up territories in autumn. Again, Nice (1937) notes that the two most vigorous singers among her female Song-Sparrows were two which stayed the winter. Bullough and Carrick (1940) have other presumptive evidence, based on beak colour, for the secretion of male sex hormone by the female Starling in autumn, and state further that Continental Starlings, which, unlike the British birds are migratory, show much less sexual behaviour in autumn than the British birds. It need not be thought impossible, or even exceptional, for a female bird to produce male sex hormone, *e.g.*, Noble and Wurm (1940) find that this is normal in the female Night-Heron (*Nycticorax n. hoactli*).

The above view is tentative, and in any case must not be carried too far. Autumn sexual behaviour occurs not only among resident species, but among wholly migratory species such as the warblers and swallows. Further, migratory Continental Robins sing in their winter quarters (Alexander, 1917), though it is not known whether the females sing. All that is suggested is that a general tendency for a temporary recrudescence of breeding behaviour in the autumn may, in a few species, notably Robin, Mocking-bird and Starling, have been exaggerated, owing to a correlated selective advantage in inhibiting migration.

DIMORPHISM IN MIGRATORY BEHAVIOUR.

The ringing returns for the Black-headed Gull and Cormorant in Britain show that there is no dividing line between "residents" and "migrants." There is simply a general tendency, particularly among the juveniles, to drift south, some individuals going farther than others. On the other hand the Passerine and Limicoline species investigated show a sharp dimorphism in behaviour, some staying close to where ringed, the rest moving a considerable distance. This dimorphism in behaviour is as clear-cut as the structural dimorphism shown, for instance, by the light and dark forms of the Arctic Skua (*Stercorarius parasiticus*) or the bridled and unbridled Guillemots (*Uria aalge*), and further resembles such cases in that the proportion of each type is different in different regions. For example,

in the extreme north of its range the Robin is completely migratory, whereas in the islands south-west of Europe none migrate. Intermediately some individuals migrate and others reside, the proportion differing markedly in different regions.

Among the Song-Sparrows breeding in Ohio, some reside and others migrate for the winter. Nice (1937) showed that in cases in which both parents were migrants, the offspring might be either resident or migratory, while the only recorded product of two resident parents was a resident. These results are too few on which to base conclusions, but are not inconsistent with the view that resident behaviour is inherited as a recessive. However, it is highly improbable that the issue would be as simple as this, and there is the complication that some individuals which migrated one year were resident the next year, and also *vice versa*. It may also be asked, what is it which is inherited? Whether a particular individual bird migrates or stays the winter is probably determined by the interaction of a number of external environmental and internal physiological factors. One physiological factor affecting migration which might be inherited is an increased production of male sex hormone in autumn, but the observable effects of this might be different in different regions, and also in different years in the same region, depending on environmental factors. There are presumably other internal factors affecting migration which are inherited.

Very possibly, migration occurs when a particular threshold value of internal factors is reached, a threshold which may well be different under different environmental conditions or for different races of the same species. All that can be observed at present is which side of this threshold value each individual bird comes. However, it is possible that, if the internal factors could be measured directly, then the individuals of the species might be found to form an evenly graded series. In the latter event, although the effect, migration or non-migration, is clear-cut, it would scarcely be correct to call the species dimorphic.

POLYMORPHISM IN MIGRATORY BEHAVIOUR.

In many British partial migrants the problem is more complex than that discussed in the preceding section, since each individual bird has three alternatives, to stay for the winter, to migrate south to France, Spain and Portugal, or to migrate west to Ireland. Behaviour is not dimorphic but trimorphic. That the Irish migration is quite distinct from that to France, Spain and Portugal is clear from several points. Firstly the directions of these two wintering regions from the breeding haunts are approximately at right angles, the one west, the other south. Secondly, birds do not normally migrate to winter intermediately, in south-eastern and southern England. (The few which migrate to winter in the extreme west of England and Wales are clearly outliers of the Irish migration). Thirdly, in the migration to France and Spain juveniles migrate more than adults, but this tendency is entirely absent from the Irish migration.

The ringing returns show that the different Passerine and Limico-

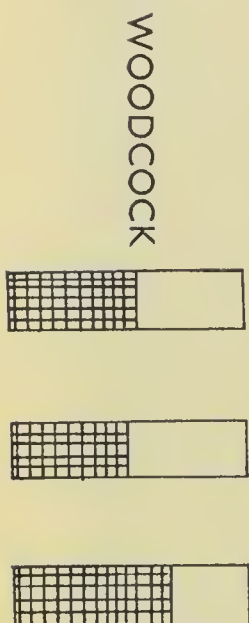
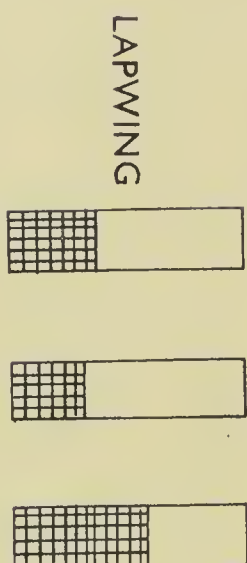
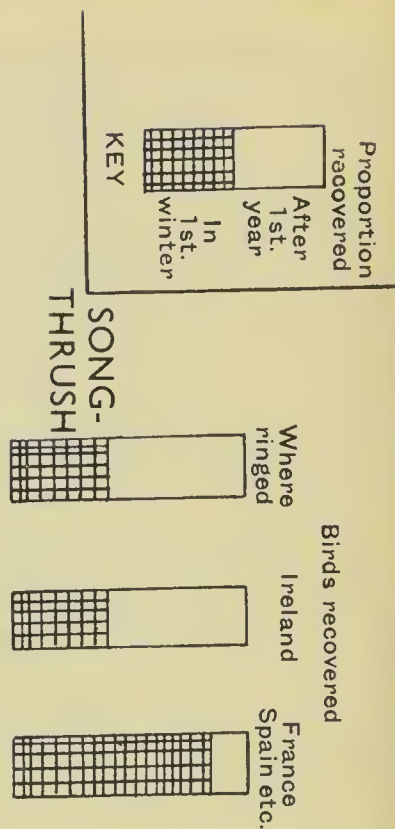
line species differ considerably in the proportions which respectively migrate south to France, Spain and Portugal, or migrate west to Ireland, or stay the winter near where ringed. In Song-Thrush and Lapwing, all three types are well represented. In Blackbird and Curlew, migration to Ireland is regular but migration to France and Spain is rare. In Robin and Pied Wagtail migration to Ireland is relatively rare, but migration to France regular. Further, within one species the proportions of each type vary markedly in different parts of Britain. Migration to Ireland is found most commonly among the individuals breeding in Scotland and the Borders, while migration to France and Spain is commonest among those nesting in southern England. The proportion which stay for the winter is usually greatest in southern England. These variations in regard to age and region of birth are summarised for some species in Figs. 1 and 2.

The suggestion may be hazarded that the southward migration to France, Spain and Portugal is an old-established habit, homologous with the migration of the representatives of the same species breeding on the mainland of the European Continent. Very possibly, as already discussed, this habit is gradually disappearing among a number of species breeding in Britain, since members of the Continental forms of the same species tend to be more migratory. On the other hand it is possible that the westward migration to Ireland is a relatively new habit. A westward or south-westward direction is that favoured by many species during hard weather movements, *i.e.*, movements occurring during the winter as a direct result of unusually cold weather. Possibly the Irish migration had its beginnings in such hard weather movements, but at the present time it seems far too regular and starts too early in the autumn to be classified as such. In any case it is hard to differentiate completely between true migration and a hard weather movement.

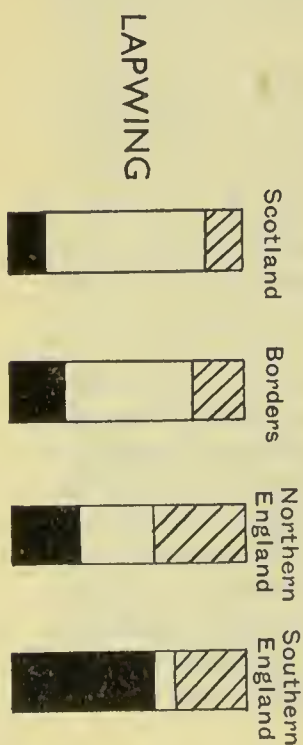
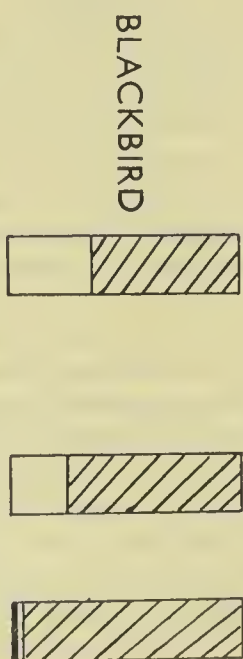
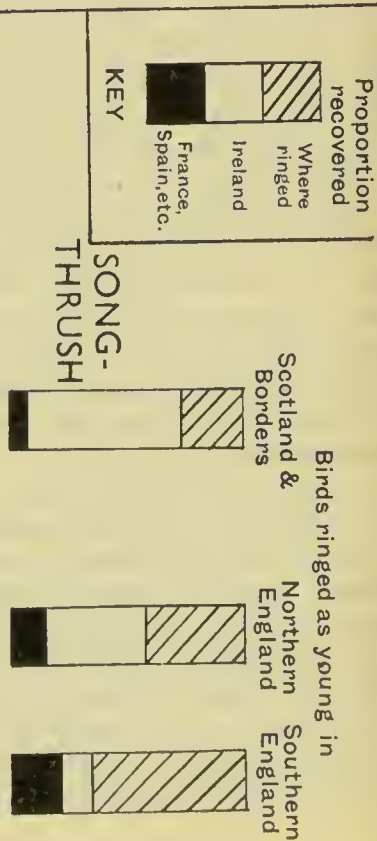
The hypothesis raised in the last paragraph will also explain why a relatively greater number of young birds take part in the southward migration but not in the migration to Ireland. The former is correlated with the fact that one of the timing factors in the southward migration is the quantity of male sex hormone. If this southward migration is in process of being abandoned, while the migration to Ireland is in process of being acquired, it is obvious that the latter movement must utilise a different internal timing mechanism from the former.

Landsborough Thomson (1926) first raised the question of whether the individuals of the same species showing these three different types of winter behaviour should be regarded as different *gentes* or races. *A priori* it is to be expected that genetic differences would be involved, but other factors also seem concerned, since in the southward migration physiological factors correlated with age and sex play some part, while it is very probable that the number of those migrating west to Ireland is considerably affected by environmental conditions, more individuals going in a hard than a mild winter. In short the same possibilities are raised as those discussed for the

AGE DIFFERENCES IN MIGRATORY BEHAVIOUR



REGIONAL DIFFERENCES IN MIGRATORY BEHAVIOUR



Song-Sparrow in the preceding section, but with the additional complication that three instead of only two alternatives are involved. While it is certain that some individuals which in their first year migrate south to France and Spain are in later years either resident or migrate west to Ireland, it is not of course known whether any individuals actually adopt all of the three alternatives in different winters of their lives. But this is by no means impossible.

The proportion of individuals of the species which winter in each of the three alternative regions is presumably affected by a complex of genetic, hormonal and environmental factors. Further, since the question of where an individual spends the winter obviously affects its survival, control is presumably exercised by natural selection. That the latter control is a delicate one is indicated by the fact that markedly different proportions of the three types of individual are found within the same species in different parts of Britain. In those species in which all three types of winter behaviour are found, the survival value of each is presumably fairly equal at the present time.

To conclude, the ringing returns for partially migratory species reveal a problem of remarkable complexity, and one which appears capable of full solution only with the help of large-scale and very difficult experiments.

SUMMARY.

1. A number of British breeding species show partial migration. In the Black-headed Gull and Cormorant there is a general drift southward, and "residents" cannot be distinguished from "migrants." But in certain Passerine and Limicoline species the birds either winter close to where ringed or move for a considerable distance; further to this, the migrants are sharply divided into two types, firstly those moving southward to France, Spain and Portugal, and secondly those moving westward to Ireland.

2. In all partial migrants so far investigated the females and juveniles show a greater tendency to migrate south than the adult males. There are corresponding sex and age differences in completely migratory species. This suggests that the male sex hormone may have a modifying effect on the migratory urge.

3. But in the westward migration to Ireland, there is no tendency for the juveniles to migrate more than the adults, even in those species in which the latter tendency is found in the individuals migrating southward to France and Spain.

4. There is a widespread tendency among both resident and migratory species for a partial recrudescence of breeding behaviour in the autumn. This is particularly strong in Robin and Mockingbird, in which species, as in the Starling, some females adopt male behaviour in autumn. The latter is possibly attributable to a secretion of male sex hormone at this season which has survival value in inhibiting migration.

5. The proportion of individuals which respectively migrate southward to France, Spain and Portugal, migrate westward to

Ireland, and stay the winter near where ringed, is markedly different in the different Passerine and Limicoline species considered. It is also markedly different within the same species in different parts of Britain. Probably there is a balance between genetic, internal physiological and external environmental factors, with natural selection exercising a delicate control.

ACKNOWLEDGEMENTS.

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THE FLEDGING PERIOD OF BIRDS

BY

LT.-COLONEL B. H. RYVES.

I DOUBT if there are many people who will challenge the statement that our present use or at least application of the term "Fledging Period" is unsatisfactory and often misleading. Our method—or rather lack of method—in recording events under this phase of the breeding cycle of birds has resulted in muddle, vagueness and confusion.

It is in the hope of clearing up some of our difficulties that I have set myself the task of writing the present paper.

One might reasonably infer that the period of fledging implies the number of days or weeks required by a bird just out of the egg-shell to develop the so-called state of being fledged. Here at once we are brought to a standstill by the question "when is a bird fledged?" At what stage of feathered development can a bird be reckoned to be fledged? Does fledging constitute complete or only partial growth of the feather system? To what extent is the fledging state attained in the nest? I have found no one yet who can furnish a comprehensive answer to these important questions.

In actual practice, when securing our records, the condition of feathering of the young brood does not enter into our calculations. We concern ourselves with the length of time the young birds have passed in the nest. But, it could very reasonably be argued that, in spite of the lack of a precise definition of fledging, a bird that leaves its nest (as many do) with down on its head and body, its tail only just sprouting, the quills of its flight-feathers still partially bare and itself unable to fly can hardly be regarded as a fledged bird and certainly not a fully fledged one.

In view of the present ambiguity I might even suggest that the paradoxical term "Fledging Period" should be abolished in favour of the more accurate and exact term "Period in Nest." However, with the advance of ornithology, the "Fledging Period" and the "Period in the Nest" will, I believe, be regarded and treated as separate phases for investigation, though one will always dovetail into the other. It will only be possible to differentiate clearly between these two periods when ornithological authority has arrived at an unambiguous and clear-cut definition of what constitutes "Fledging."

Undoubtedly, this subject should and can be clarified in the light of our present application of the term which I have described as paradoxical. I therefore venture to submit for the consideration of all interested ornithologists a definition which I believe simplifies our problem and furnishes me at once with a basis on which to evolve and elaborate my arguments. My suggested definition of

the "Fledging Period" (as the term is generally used at the present day—my "Period in Nest") is:—

The Period during which the young remain in the nest, which they finally abandon under natural conditions, in varying stages of general development.

This definition avoids any question of the birds' feathered condition, but it does not exclude elaboration on the point in a footnote. It also covers the young of all species from those that leave the nest when only an hour or so old to those which remain until they have apparently acquired full feather development (Raven, Peregrine, Buzzard, etc.). I use advisedly the word "apparently" for, without an authoritative definition of fledging, one must avoid being dogmatic.

Before embarking on my main arguments I think it necessary to elaborate certain phrases in my definition above. The first concerns the words "*under natural conditions*":—here may I stress the importance of recording a period only if it seems clear that the young left the nest without the outside influence of fear. If the young were scared out by the observer the record loses a great deal of its value because, had they not been disturbed, they might have stayed for some time longer.

Next, I would lay special emphasis on the word "*finally*", for here, I think, lurks one of the chief causes of the wide and often puzzling variations in the period recorded for different broods of the same species. By "*finally*" I mean the definite abandonment of the nest for good and all. I can best illustrate the point by quoting actual examples within my own experience, which, of course, could be multiplied:—

(a) MAGPIE (*Pica p. pica*).—Nest near the top of a very tall pine. No ground cover of low bushes or scrub. When 27-28 days old, the young began to scramble out of the nest and play about, chattering, among the branches alongside. But they seemed soon to take fright and dive back into their shelter. This sort of behaviour continued, but they became somewhat bolder with each passing day. When 36-37 days old, I saw one young (the others soon followed) "take the plunge" and fly fairly strongly to a big tree 30 yards distant. The nest had been finally abandoned. Their tails were about half the full length and the birds appeared strong both of wing and foot. I recorded the period as 36-37 days. Another observer might well have recorded 27-28 days on the grounds that, as they were able to leave the nest, they could be regarded as fledged.

Here we have an example of conflicting view-points resulting in a disparity of nine days in the estimation of the period by two separate observers of the same nest. Surely this affords clear enough proof of the need of stabilisation of the method of recording. But more of this later.

(b) WOOD-PIGEON (*Columba p. palumbus*).—Close observation with this species is necessary to establish the exact date a brood

finally abandons the nest. The young begin by "walking out" and perching a few feet away for a time and then returning to the nest. The parent, however, usually alights at the temporarily vacated nest and uses it as a convenient platform on which to "collect" the young and feed them. This behaviour may continue for several days before the nest is finally deserted. For myself, I always record the period as up to the night the young roost outside the nest for the first time. Even after this the fledglings may stay in the nearby trees for several days before they make a flight. Here again we have a notable example of the urgency of a stable method of recording. •

I have already referred to the puzzling variations of records of different broods of the same species—puzzling because of their extraordinary wideness. Pending an agreed or recognised formula of recording, a good deal of the ambiguity might be eliminated if observers were to adopt their own formula and attach an explanatory note with their records. The Editor might then be in a position to tabulate all records received under some systematic scheme.

Though all of us are well acquainted with the common spectacle it needs emphasis here: I refer to the noticeable differences in development of "fledged" birds of not only the same species, but of different ones at the time they first pass into the world. Some appear to be almost hopelessly immature, covered with down and only able to hop about feebly on the ground. Others, though obviously immature too, move about strongly among the bushes or perch firmly in the taller trees. Others again—they may be tits, Goldcrests or Goldfinches—are wonderfully strong on the wing and within an hour or two have travelled hundreds of yards. I have watched a brood of Chiffchaffs leaving their nest in a hedge four feet above the ground; one by one, in quick succession, they flew straight across an open meadow and alighted without flurry in thick cover 25 to 30 yards away. Had the nest actually been in that cover, there would have been no need for such an immediate flight and they might have left it earlier.

The above sketch gives a rough outline of the extent of variability in development of fledglings, which embraces variability of the period in nest.

Let me digress for a moment from the main issue under discussion. In the case of many birds it is my belief that almost as much development towards complete fledging takes place after the nest is quitted as during the stay in it. Further, I do not believe that the variations in this process are as great as those in the period spent in the nest. Some variation there surely must be, but negligible in comparison. Obviously the question of diet and possibly of weather also must influence to some extent the growth of a bird.

I can now proceed to discuss some of the possible causes of lengthy or comparatively short periods in the nest. I do not for an instant claim infallibility of my arguments. I merely submit them for what

they may be worth as a line for the conduct of much fuller investigation. It may be convenient to tabulate them under specific headings:—

(1) *Disturbance*.—There seems nothing to add to what I have already said.

(2) *Height of nest and its environment*.—An example of a lengthy stay has already been given for a Magpie with a nest in a tall pine. The following is an instance of a much shorter period with the same species whose nest was in a secluded stretch of low bushes and thick scrub. The date of hatching was not known, but I visited the nest when the young had apparently scrambled out of it quite recently. Their tails were about two inches long and the birds could only flutter a few feet. I could easily have caught them, for some of them could not retain their perches and fell to the ground. In this case I surmised that the existence of excellent cover all round the nest had tempted them to abandon it before they could fly. There was no need for them to use their wings. I calculated that they were about 25 days old.

I may give one more example where considerable variation might reasonably be expected. It concerns the broods of two pairs of Shags (*Phalacrocorax a. aristotelis*). The nest of one of them was at ground level on an island rock and that of the other on a perpendicular cliff, 250 feet above the sea. With the critical data I have given, a wide variation between the two broods would be quite intelligible.

(3) *Overcrowding of a nest*.—This may cause confusion and alarm, with the result that one or two young are edged out of the nest and the rest follow them.

(4) *Hunger*.—Ill-fed birds can become so hungry that, when at last a parent is seen approaching, some of them make a frantic effort to reach it and secure the meal first.

(5) *Precocity*.—Sometimes a brood contains one young bird stronger and more advanced than the others. I have seen such a youngster, denied the meal brought by a parent, jump out of the nest and try to follow it as it departs. This can create general confusion with the result that all the young tumble out of the nest.

(6) *Weather*.—Cold or strong winds seem to have a trend towards prolongation of the stay in nest, whereas very wet conditions have a tendency to accelerate departure, particularly if the nest becomes unduly sodden.

To conclude, I earnestly hope that this paper may achieve its purpose of rousing the interest of field observers and inducing them to make it a matter of routine to attach to their "fledging" (period in the nest) records all such critical data as appear to be relevant.

NOTES.

FEATHERS AS NESTING MATERIAL OF
RED-BACKED SHRIKE.

WITH reference to the notes under the above heading, I have not infrequently found feathers in nests of the Red-backed Shrike (*Lanius c. collurio*) in Somerset and I am sure of three or four nests with an abundance. One in my collection, taken at Cheddar with five eggs on June 17th, 1922, is described on the data ticket as "composed of an abundance of feathers; hair, coarse bents, stalks and moss, lined with feathers and horsehair." Another remarkable nest taken near Cheddar, June 5th, 1922, is described as containing "a lot of cotton, and even a needle threaded with silk; also a fair amount of twine and some paper." STANLEY LEWIS.

IN June, 1917, at Headley, Surrey, and in May, 1920, on Bookham Common in the same county I found nests of the Red-backed Shrike (*Lanius c. collurio*) in the construction of which, in the former case red and in the latter white, chicken feathers had been lavishly used. In each case the source of the feather supply was obvious and near at hand, but four other Shrike's nests near the second nest, which incidentally held a Cuckoo's egg, were built of normal material.

Apart from these two nests I do not remember seeing a single feather in any of the many Shrike's nests I have examined in England and on the continent of Europe. G. CHARTERIS.

DISPLAY OF RED-BACKED SHRIKE.

ON June 8th, 1943, in Surrey, I observed a display of the Red-backed Shrike (*Lanius c. collurio*). The female was perched on a small sapling a short distance away from a large thicket of hawthorn, blackthorn and bramble, on the edge of which the cock was perched. The male then flew over to the female and, settling two or three inches away from her, began a performance of exaggerated bowing and scraping, making, altogether, a figure ludicrous in the extreme. This was accompanied by a very soft and sweet twittering just audible at twenty yards. This went on for some minutes, during which time the hen remained absolutely motionless and appeared completely uninterested. Suddenly, however, she flew and made straight for the thicket, followed closely by the cock.

I crept round cautiously and saw both birds leave a certain bush, but careful examination of this and the rest of the thicket revealed no sign of a nest in any stage of construction. Subsequently, however, it was in this bush that the nest was built, and it contained one egg on June 13th. The display may, therefore, in this case have borne some relation to site-selection or the commencement of building. H. J. HOFFMANN.

RED-BREASTED FLYCATCHERS IN BUCKINGHAMSHIRE
AND KENT.

ON May 4th, 1943, my wife and I observed a Red-breasted Flycatcher (*Muscicapa p. parva*) on the outskirts of the wood on the slopes of Boddington Hill, near Wendover. The bird was taken for a darkish Robin until it did the typical "flycatcher" performance and showed the white patches on the base of the tail at the sides.

F. W. WATKYN-THOMAS.

ON May 8th, 1943, we observed a bird, identified as a Red-breasted Flycatcher (*Muscicapa p. parva*) in a field at Medhurst Row, Kent. The bird was observed without field-glasses when flying. It perched at regular intervals on a large oak tree in the shade, which made observation of it when at rest very difficult. It made periodic circuits in the air, swooping and darting after flies, but always returning to the same tree. It appeared to be about the size of an ordinary Swallow. The body was chestnut-brown, the breast a vivid scarlet and there appeared to be a white band on either side of the tail.

Since neither of the witnesses is an ornithologist no especial importance was attached to it, and it was only due to a chance discussion with Mr. B. S. Whidborne that it appeared to be a rare occurrence.

ROBERT E. ALLFREY AND R. M. J. KNASTER.

THE BEGINNINGS OF A GOLDCREST'S NEST.

A PAIR of Goldcrests (*Regulus r. anglorum*) was located in a woodland area of firs and rhododendrons in Kent on March 23rd, 1943. They appeared to be nest-site hunting and most interested in one particular fir, in which I watched both birds threading their ways through the foliage, stopping at intervals, flying away to adjacent trees and then back again to the tree in question, where the performance was repeated. At the time the weather was very bright and warm, as it had been for some weeks, which may account for the fact that, although I visited the spot almost every day thereafter, I did not get a glimpse of the birds again till April 1st, when I saw building actually commence.

On reaching the spot I saw no sign of the birds at first, but after about 15 minutes I spotted them in a nearby fir. They almost immediately flew into the suspected fir and, after a minute or two, the hen—presumably—flew down to the ground beneath a rhododendron bush a few yards from where I was sitting. She almost immediately afterwards flew back to the tree carrying a wisp of something in her beak and, working her way down a branch, reached a spot at the end of it, some 12 feet from the ground. After that she was never inactive, making a trip to and from the site about every half minute. I noticed that she never flew straight to the site, but always went inside the tree first and worked her way down the branch. After watching for some time I decided to try to see if I could discern any sign of the nest from the ground. This I was unable to do, the patch of foliage being to all appearances completely devoid of any nesting material.

The following day, April 2nd, the beginning of the nest was plainly visible and building was going on rapidly. I never once saw the cock carry material, although he was constantly in attendance, calling continuously with a faint note.

On April 5th the nest had a finished appearance and thereafter I never saw the birds for about three weeks, although I visited the nest almost daily. On April 25th, having seen nothing of the birds since April 5th, I decided to look into the nest and found it contained six eggs. These were eventually increased to eight and the hen started sitting on April 28th. Assuming that the construction of the nest was completed on April 5th, this would give an interval of fifteen days before the first egg was laid. Possibly the early fine weather resulted in the birds building somewhat prematurely.

H. J. HOFFMANN.

It must be considered a rare occasion to find a nest of the Goldcrest (*Regulus r. anglorum*) in the very earliest stage of construction.

In April last my brother and I noticed a bird leave the end of a branch of larch, which was within hands' reach. A close inspection revealed the secret of how this species manages to sling its nest. To one branch two silk-like threads, some distance apart were attached and hung down, the ends joining another in the centre which carried on and this single one was secured to the opposite branch, the shape being similar to a curved riding stirrup. The threads had the appearance of spider's web or something similar, into which very small particles of vegetable matter, possibly lichen or moss, were mixed. From this baggy and flimsy "foundation" the nest progressed.

As this species appears to have a somewhat remarkable incubation period we decided to satisfy ourselves on this point. Unfortunately our purpose was not achieved owing to the destructive work of the Grey Squirrel—an all too common sequel. D. W. MUSSELWHITE.

BLACKBIRD KILLING SLOW-WORM.

WITH reference to the note by Dr. C. J. F. Coombs on a Blackbird (*Turdus m. merula*) killing a Slow-worm (*antea*, p. 116), the following is an extract from *Cornwall Bird Watching and Preservation Society's Report* for 1932 :—"On May 6th, in my garden, a female Blackbird was seen dancing and jumping about in an extraordinary way and it was found that she was tackling a Slow-worm. Finally she went off to her nest with the severed tail." (Recorded by the late Mr. C. Nicholson).

In 1935, in July, I myself saw a male Blackbird fluttering over the path and frequently striking at a large Slow-worm. Unfortunately I frightened the bird and the Slow-worm wriggled into the herbage where I could not trace it. B. H. RYVES.

BLACKBIRD ATTACKING GRASS-SNAKE.

APROPOS the note by Mr. C. J. F. Coombs (*antea*, p. 116) on a Blackbird killing Slow-worm, it may be of interest to quote from

my diary a record of an adult male Blackbird (*Turdus m. merula*) attacking a young Grass-Snake (*Tropidonotus natrix*) on May 7th, 1942. My wife called my attention to the behaviour of the Blackbird, which was pecking at the snake in our small garden bordering a busy road in Cheltenham, Glos. I ran forward and the bird then tried to fly away with the snake in its bill, which, however, it dropped. I caught the snake, which measured 7 inches in length and $\frac{1}{4}$ inch in breadth at its widest dimension and seemed to be uninjured. The Blackbird seemed to be in worn plumage and may have been feeding young.

OLIVER H. WILD.

MARSH-HARRIER IN DORSET.

ON October 24th, 1943 a Marsh-Harrier (*Circus æ. aeruginosus*) was seen by the writer and Messrs. D. R. Goddard and C. D. Lindley on a stretch of marshland known as Swineham Point, between the Frome and the Piddle, where they flow into Poole Harbour. It was evidently a young bird, being a dark brown all over, and was watched quartering over the reeds and occasionally dropping out of sight. It was seen again on November 8th. J. R. M. TENNENT.

GLOSSY IBIS IN GLOUCESTERSHIRE.

ON October 23rd, 1943 in company with my wife, I saw at a sewage farm near Cheltenham, Gloucestershire, a Glossy Ibis (*Plegadis f. falcinellus*), which after flying round settled on a bank of an open-air sewage channel. The bird was examined through field-glasses at a distance of less than 100 yards. It was feeding with Lesser Black-backed Gulls and Carrion Crows. It was very restless and several times flew to a great height when approached, but settled again in other sewage channels, within a quarter mile radius. This bird had been frequenting the same spot for about a fortnight previous to my visit. It seemed to be all black, but distinctly more brown in colour than the crows. No white streaking was seen on the head and neck.

OLIVER H. WILD.

DIVING OF GREY LAG-GESE.

THE *Handbook* mentions the diving of grey geese in self-defence when young, injured or flightless through moult, but I wonder if others have noted plunging apparently almost as a form of play.

On December 2nd, 1943 I was watching 400 Grey Lags (*Anser a. anser*) on the Kent Estuary, Westmorland, with a powerful telescope. Many were bathing on the water, ducking head and neck, flapping wings and so on, and I saw five or six perform a sort of somersault dive. They dived forwards, disappeared momentarily, and emerged facing the other way and lying on their backs with feet in the air. One or two of them lay like this, kicking in the air, for several seconds before righting themselves.

J. A. G. BARNES.

[I have seen this "somersault dive" performed by a Chinese Goose (*Anser cygnoides*), but so far as I am aware it has not been recorded in any wild grey geese.—B.W.T.]

WHITE-FRONTED GEESE FEEDING ON BARLEY.

IN referring to the food of the White-fronted Goose (*Anser a. albifrons*) in winter quarters *The Handbook* states "probably at times grain." It may therefore be interesting to record that the crop of a White-fronted Goose recently shot in east Kent contained barley and that the small flock out of which the bird was shot fed regularly on a barley stubble. T. C. GREGORY.

SCANDINAVIAN HERRING-GULLS IN SCOTLAND
AND LINCOLNSHIRE.

SINCE my note was published (*antea*, Vol. xxxv, p. 159) on the occurrence in Yorkshire of a Scandinavian Herring-Gull (*Larus a. omissus*) three more specimens from the Murman Coast have been reported and details obtained from the Central Bureau for Bird-Ringing in Moscow. All were first winter birds, as was the Yorkshire one. B.11524 was ringed on August 1st, 1940 and recovered at Strathleven, Dumbartonshire in May, 1941. C.33728 and D.80784 were both ringed on July 18th, 1941, the former being recovered at Saltfleet, Lincolnshire on February 26th, 1942 and the latter at Yarrow, Selkirkshire in March, 1942. These occurrences point to the possibility of this sub-species being a more frequent visitor to the British Isles than is commonly supposed, but in the immature plumage they would naturally escape notice. E. P. LEACH.

MAGPIES PERCHING ON SHEEPS' BACKS.—Mr. J. C. S. Ellis informs us that on October 16th, 1943, near Delamere, Cheshire, he observed a party of five Magpies (*Pica p. pica*) attending on a flock of sheep. The birds were sitting on the backs and heads of the animals and appeared to be picking something off (? ticks) and eating it, the sheep paying little attention. This habit is not unusual in Starlings and may sometimes be observed in the case of Jackdaws, but we do not recall any previously recorded instances for Magpies.

UNUSUAL SITE OF CHAFFINCH'S NEST.—Mr. K. R. Chandler informs us that in June, 1937, he observed a nest of Chaffinches (*Fringilla cælebs gengleri*) built on the top of a beam in a railway station at Hastings. The birds were feeding young. Nests have been recorded in sheds.

PROLONGED TRILL OF WOOD-WARBLER.—Mr. H. R. Tutt informs us of a Wood-Warbler (*Phylloscopus sibilatrix*) in Surrey in June, 1943, which used a remarkably prolonged trill. He writes that the bird several times omitted the introductory notes before the trill and sang only the trilling part of the song while he counted from 20 to 26 at about second intervals for various trills. Only one lasted for a count of 26, but several up to 23. This was heard several times on each of three days until the nest was found on June 23rd, after which the song became normal.

BLACKCAPS' NESTS DECORATED WITH MOSS.—Major G. E. Took writes that on May 24th, 1943, a male Blackcap (*Sylvia a. atricapilla*) was seen by Mr. J. M. E. Took carrying green moss. The nest, which contained five fresh eggs, was found to be decorated round the edge with freshly gathered moss, though otherwise typical. Mr. G. C. S. Ingram has given us particulars of a Blackcap's nest found by him and Col. H. Morrey Salmon in Glamorgan on May 20th, 1928, which also contained quite a large quantity of moss woven into the outer fabric, especially near the top and was altogether more compact and solid than any other Blackcap's nest he has seen.

SWALLOWS NESTING AT HIGH ELEVATION.—Mr. Seton Gordon has sent us a note of a Swallow's (*Hirundo r. rustica*) nest containing one egg which was found by him some years ago at Loch Builg stalking lodge in Invercauld Forest, Aberdeenshire, at 1,600 ft. above sea-level.

LATE NIGHTJAR IN SUSSEX.—Lieut. John M. Lade, R.N.V.R. sends us particulars of a Nightjar (*Caprimulgus e. europæus*) flushed by him on the downs behind Lancing College on October 11th, 1943. From the absence of white on wings and tail it was evidently a female or young bird.

LATE DRUMMING OF GREAT SPOTTED WOODPECKER.—Mr. J. H. Owen reports a case of a Great Spotted Woodpecker (*Dryobates major anglicus*) which came and drummed quite near him on three occasions during October 7th, 1943, near Blodwel on the Shropshire border. He also states that his brother, Mr. O. R. Owen, heard and saw one drumming repeatedly on October 11th, 1943, near Leominster. Mr. H. G. Alexander in *The Handbook* gives no dates between mid-May and the end of December.

BLACK-TAILED GODWIT IN ANGLESEY.—In view of recent records of Black-tailed Godwits (*Limosa l. limosa*) in North Wales, where the species has not often been recorded (*antea*, p. 139 and Vol. xxxvi, p. 118), Mr. S. V. Wild has informed us of an example seen by him at Red Wharf Bay, Anglesey, on August 25th and 26th, 1943. The previous scarcity of records was possibly due partly to lack of observation, though the species has increased as a passage migrant in Great Britain in recent years.

GREEN SANDPIPER IN CO. MAYO.—Major Robert F. Rutledge reports that he had very close views of a Green Sandpiper (*Tringa ochropus*) on the shores of Lough Carra on September 12th, 1943. This is only the second recorded occurrence for Co. Mayo and only the ninth for Connaught.

GREENSHANKS INLAND IN CO. MAYO.—Major Robert F. Rutledge reports that single Greenshanks (*Tringa nebularia*) seen by him on August 17th and September 12th, and two on August 18th, 1943, on Lough Carra, form the only inland records he has of the bird in Co. Mayo. In Ireland "this species rarely wanders to inland waters" (Humphreys, *List of Irish Birds*, p. 50).

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THE EDITORSHIP.

In accordance with what I believe to have been Mr. Witherby's wishes, I have undertaken the Editorship of *British Birds* at least for the present. I am very conscious how exacting is the task of succeeding him, but I venture to hope that British ornithologists will accord me something of the confidence and ready co-operation which they gave to him and on which the success of this journal so much depends. An announcement with regard to the Assistant Editorship will be made later.

B. W. TUCKER.

HARRY FORBES WITHERBY: A Biographical Sketch

BY

B. W. TUCKER.

It seems but a little time ago that British ornithologists and the editors and readers of this magazine in particular had to deplore the loss of F. C. R. Jourdain, who was so closely associated with *British Birds* from almost its earliest days. Now, less than four years after, we mourn the death of Harry Witherby, our founder and editor throughout the thirty-six and a half years of our existence as a journal, and so grievous a loss, following so close on the other, seems well-nigh overwhelming.

Yet, looking back on all that Witherby accomplished we can, while deploring his loss, "be thankful", as I wrote in the brief preliminary announcement of his death, "for a life so fruitful in the advancement of our science and for the fact that he lived to see the culmination of his work in *The Handbook* and the enthusiasm with which it was received by ornithologists everywhere." But it would be idle to pretend that anyone at the present time can adequately fill his place. His grip of both the systematic and field aspects of our subject was remarkable and the range of his contacts with other ornithologists, both specialists and amateurs, was hardly less so. Himself primarily a systematist and an authority on plumages and racial differentiation, he was also keenly interested in distribution and migration and was an able field observer, while even in dealing with aspects of ornithology in which he was not himself a specialist his critical judgment and sound good-sense were seldom at fault. His editorship of this journal brought him into relation with ornithologists up and down the country in a peculiarly effective way, and his high reputation and sympathetic responsiveness to every genuine student made him the natural recipient alike of information on all observations of importance on British birds and of requests for assistance or advice which he himself was so well qualified to impart. In consequence, to quote again from my earlier notice, "he had come to represent and almost, as it were, to personify British Ornithology in a unique way", and the loss entailed by his death would be impossible to exaggerate.

He had been in poor health for some time, but it was only in September that he became seriously ill. For some time it was hoped that with care and rest and relief from work he might recover or at least that his life might be prolonged, but after a period of apparent improvement followed by a grave set-back it became evident that there was no real hope of his recovery, and he died on December 11th, 1943, at the age of seventy.



HARRY FORBES WITHERBY.

Corsica, June 1937.

(Photographed by John Armitage)



Harry Forbes Witherby was born on October 7th, 1873. He was the second surviving son of Henry Forbes Witherby, R.B.A., of Burley, Hants, and his early experiences in the New Forest are reflected in his first published writings on birds, in the scientific magazine *Knowledge*. These were published in an amended form in a little book called *Forest Birds: their haunts and habits* (1894) when he was twenty-one.

After leaving school he joined the family business of Witherby & Co., of which he became senior partner at his father's death. For a number of years now under the title of H. F. & G. Witherby the publishing firm has made a speciality of ornithological, sporting and travel books, and it has undoubtedly been to the advantage of ornithology in this country that the editor of standard works like *The Handbook*, as well as of this magazine, could also be their publisher.

In 1904 he married Lilian, daughter of the late Rev. S. Gillson, of Itchen Abbas, Hants. No account of Witherby would be complete without some reference to his happy family life, and it is perhaps permissible to recall his graceful tribute in the *Ibis* to Mrs. Witherby, "who even learned to skin birds on our first trip together . . . and has endured hard places and discomforts for the sake of my pursuit." They had two sons and three daughters.

In the last war, as a Lieutenant in the R.N.V.R., Witherby served in 1917-18 as intelligence officer to his friend Hubert Lynes at Dunkirk. He was mentioned in despatches and awarded the M.B.E.

In 1936 he retired from full participation in the work of the firm and settled at Chobham, near Woking, where he had acquired the pleasantly named property of Gracious Pond Farm. The fifteenth century building was adapted and extended in a remarkably successful and harmonious way and he settled down with almost boyish enthusiasm to planning the garden. Gardening was one of his greatest interests after ornithology, and the garden at Gracious Pond Farm was a constant joy to him. In addition, a derelict pond in the adjacent wood was cleared and converted into a little sanctuary for duck and other birds, and with Wood-Larks breeding on the premises and such birds as Curlew and Dartford-Warblers on the neighbouring common the conditions seemed ideal for the retirement of an ornithologist. Many other ornithologists have enjoyed his and Mrs. Witherby's hospitality in these charming surroundings.

But the war interrupted his retirement. In time it became necessary for him to resume work in connexion with the firm which he had previously given up and to pay regular visits to London. Already not in very robust health, he shouldered the task with characteristic good humour, but he certainly felt the strain and there can be very little doubt that it helped to lower his vitality. Like that of so many others not in the prime of

life, who, to relieve younger men, willingly took up labours which overtaxed their strength, his death would probably be rightly regarded as an indirect consequence of the war.

Though he was always deeply interested in living birds, Witherby's earlier ornithological activities were primarily devoted to the collection and study of skins. He early became interested in the subject of plumage changes and moults on which he was to become a leading authority, and his splendid collection of British and Western Palearctic birds, which ultimately numbered over nine thousand skins, was formed primarily with the object of studying these phenomena. In 1898 he visited the delta of the Guadalquivir and subsequently, prior to his marriage, carried out several more ambitious collecting expeditions, the results of which are recorded in the *Ibis*. The first was a crossing of the Kola Peninsula from Kandalax to Kola and Ekaterina, which he carried out in July, 1899, in company with his friend A. E. Hamerton, such an expedition being then much more of an undertaking than trips to various parts of Lapland in recent years.

His next expedition (1900) was up the White Nile from Khartoum to El Kawa, which in addition to the *Ibis* account, he described at greater length and in a more popular style in *Knowledge* and, with slight alterations, in book form under the title *Bird Hunting on the White Nile*. The next, and most important, was a journey of some 800 miles through the region of Fars in South-west Persia, made in 1902 and graphically described in the *Ibis* (1903). It resulted in a collection of considerable interest, containing, as he himself described it, "many 'intermediate' and more or less local forms." The conclusion of the Persian journey marked the end of the period of Witherby's more remote explorations. In 1904 he and Mrs. Witherby spent from March to May in Algeria, successfully combining a honeymoon with collecting, in which his wife assisted. The visits to Spain, on which Mrs. Witherby regularly accompanied him, belong to the period after the war of 1914-18 and will be referred to later.

Between 1897 and 1903 Witherby conducted a column of ornithological notes in *Knowledge*, which was published by his firm; but the need for a magazine devoted entirely to birds was becoming more and more apparent, and in 1907, assisted by the late W. P. Pycraft, he launched *British Birds*, outlining in the first number the aims which under his wise guidance it in fact so successfully achieved. Howard Saunders contributed an important article to that number on "Additions to the List of British Birds since 1899". Hartert, Rothschild, Pycraft, F. C. Selous and others contributed to the first volume, and Witherby himself, with N. F. Ticehurst, began a valuable series "On the more important additions to our knowledge of British Birds since 1899", the year when the second edition of Saunders's

Manual was published. *British Birds* thus started auspiciously and its success was soon assured. In 1909 Jourdain and N. F. Ticehurst joined the editorial staff and, Pycraft having withdrawn soon afterwards, the triumvirate was thus established which was to collaborate so productively for many years.

To review the history of *British Birds* under Witherby's editorship would be beyond the scope of a memoir such as this and would in any case take far more space than present conditions allow, but reference must be made to one special development in connexion with the magazine because of its outstanding importance. This was the *British Birds* Marking Scheme. Witherby had always been much interested in migration and its problems. As early as 1896 he visited Spurn with Eagle Clarke and others. Subsequently he visited Holy Island and other East Coast localities to observe migration and—to refer to a much later period—in 1938 he even realized a long-held wish by visiting Fair Isle. In 1909, impressed by the pioneer results of Mortensen in Denmark and the Rossitten station in Germany, he inaugurated the *British Birds* scheme. It is almost superfluous to stress the great importance of the results which this achieved and the outstanding value of the contribution it has made to our knowledge of the movements of Western Palearctic migrants. Its initiation and organization must be reckoned one of Witherby's major contributions to ornithology. For years he worked up the results and prepared the reports himself, while the routine work and the storage of the records was done at his firm's office, though from 1930 onwards much of the work was taken over by Miss E. P. Leach, whose invaluable assistance he always enthusiastically acknowledged. It was only finally in 1937, with the continued increase in volume of the work and the pressure of other claims, such as that of *The Handbook*, on his time, that arrangements were made for the transference of the scheme to the British Trust for Ornithology and the provision of headquarters for it at the British Museum (Natural History). This arrangement he rightly regarded as a highly satisfactory one for ensuring the continuance of the work under the best conditions.

Witherby's systematic work soon brought him into contact with Ernst Hartert, of the Tring Museum, who in the earlier years of the present century was vigorously engaged in championing the use of trinomials in nomenclature against the scornful but somewhat uneasy opposition of most of the ornithologists of the older school. Witherby was amongst the very first to recognize what may now seem the obvious justice of Hartert's contention that the facts of racial differentiation within the species required the use of a trinomial system and that the naming of what were clearly racial forms of sub-specific value as though they were full species was misleading and wrong. He applied Hartert's principles in his own writings and

advocated them in an eminently sound and logical letter to the *Ibis* in 1905. Hartert also insisted, again against much opposition, on rigid priority in nomenclature as the only means of ultimately securing stability and on the adoption, because they *were* international, of the International Rules of Zoological Nomenclature of 1891, which took as their starting point the 10th (1758) edition of Linnaeus's *Systema Naturæ*, instead of the 12th (1766), which British ornithologists had generally followed. Witherby was at first opposed to Hartert's views on strict priority, which admittedly involved changing a number of well-known names, but after a time he accepted them, and matters were brought to a head in 1912 by the appearance of *The Hand-List of British Birds* by Hartert, Jourdain, Ticehurst and Witherby, in which the classification and nomenclature were Hartert's. The rest of the information in this work was distributional and was conveniently sectionalized under the headings of British Distribution, Distribution Abroad and Migration, the first of these being mainly by Witherby. So far as nomenclature was concerned *The Hand-List* was naturally not well received by the die-hards, but they were fighting a losing battle and, to quote Witherby's own words, "the opposition gradually died down, so that by the time *The Practical Handbook of British Birds* appeared (1919-24) . . . the system had become generally adopted."

The Practical Handbook was the natural successor to *The Hand-List*, and it is no secret that the general idea of the work was Witherby's. It carried the principle of sectionalized treatment much further and was the work of the same four authors, with the addition of Annie C. Jackson (afterwards Mrs. Meinertzhagen) and Charles Oldham, with Witherby as general editor. The great feature of this work was the masterly treatment by Witherby of the successive plumages of British birds (except the ducks and waders, which were done by Miss Jackson), which were described in great detail and with characteristic care and accuracy. It would be difficult to over-emphasize the immense and devoted labour which the preparation of these descriptions must have involved. They were more complete than any previously published in a book on British birds, entailing the minute examination of a very large series of skins collected at all times of the year. As Witherby himself testified, the task would have been impossible but for the facilities given by Lord Rothschild, or the Hon. Walter Rothschild, as he then was, for the free use of his magnificent collection at Tring, but the British Museum material was also extensively consulted and his own private collection played an important part, because it contained, again to quote his own words, "many moulting and young birds which are unfortunately still considered by most collectors to be hardly worth preserving."

The Practical Handbook also contained, as is well known, brief but excellent Field-Characters by Oldham, important sections on Breeding and Food by Jourdain, and Distribution and Migration sections on much the same lines as *The Hand-List*. It at once took its place as the standard authority on British birds and remained so for well over a decade after its completion. But in 1934 it went out of print and requests were received from all quarters for a new edition. It was obvious that with the extensive changes and additions that seemed called for this would be a formidable task to prepare, and the surviving authors were no longer young. Nevertheless they rose to the occasion magnificently. I shall always vividly recall the occasion on which Witherby and Jourdain first outlined to me their ideas, saying that although they were both well on in years they felt it an obligation to do all in their power to meet the demand and need which clearly existed and generously proposed my collaboration on the field side. So *The Handbook* began to take shape and a voluminous correspondence was exchanged between Witherby and myself on the treatment of field data and on many details, interspersed with memorable visits to Gracious Pond Farm to discuss the work as it progressed. Witherby was a most helpful and stimulating and extraordinarily efficient editor and colleague, and I might add a very considerate and patient one as well. The care and pains which he devoted to every detail were remarkable, though only in keeping with all the rest of his work. Never sparing himself, he had in his quiet way the gift of getting the best out of others and when necessary extracting from them, in spite of other competing demands, just that little extra which he believed would make the work still more useful.

The general style and plan of *The Handbook* and the nature and extent of the new field and other material which it contains are so well known and so much a matter of current history that it is superfluous to recapitulate them here, but a word about the plates may not be out of place. Again in his own words, the provision of such a complete series of illustrations had long been to him "a cherished, if somewhat faint hope", owing to the prohibitive cost of having so large a series drawn. It was only after substantial progress had been made with the new work and work had even begun on two or three new plates of the *Practical Handbook* type that he conceived the idea of arranging with the proprietors of E. D. van Oordt's *Ornithologia Neerlandica* to illustrate it with reproductions of the careful and very complete plates made by the distinguished Dutch artist M. A. Koekoek for that work. Thanks to the helpful collaboration of the proprietors and of the Leiden Museum this idea was successfully realized, the requisite new plates of birds not on the Dutch list being prepared partly by Koekoek himself and partly by various British artists, Witherby as usual taking

immense pains over the selection of specimens and every other detail. This arrangement brought the provision of such a completely illustrated work within the realm of financial practicability and there can be no doubt that it was abundantly justified. For although the reproductions have sometimes been criticized as too small they are in the main remarkably successful and useful and have contributed much to the success of the work.

The completion of *The Handbook* in spite of the war and in spite of the lamented death of Jourdain while work on it was in progress was a major and richly deserved triumph for Witherby. It was a fitting culmination to his life's work for ornithology and will remain the best possible memorial to him.

Witherby's original researches, as has already been briefly noted, were concerned first and foremost with the study of plumages and moults, and the series on the "Sequence of Plumages of British Birds" which he wrote in conjunction with the late C. B. Ticehurst in Vols. III and IV of *British Birds*, and the later one on the moults of British Passeres, foreshadowed the immense task which he so successfully accomplished in the preparation of the *Practical Handbook* descriptions. An important special problem in this connexion which he cleared up was that of the bare face of the Rook, which he showed in 1913 was due to a moult and not to abrasion. His interest in the differentiation of geographical races has also been alluded to and he gave much attention to this subject. He also became the leading authority on the birds of Spain and more especially of the central region, which he visited with Mrs. Witherby in 1922, 1925 and 1927. They also visited South-east and East Spain in 1923 and 1929 respectively. The principal account of these explorations and their results is the admirable paper in the *Ibis* for 1928 "On the Birds of Central Spain". One of the most interesting and unexpected of his discoveries was that of White-spotted Bluethroats breeding in the Sierra de Gredos.

The outstanding characteristic of all Witherby's work was its great care and accuracy and his insistence on full authentication for every statement. Without any formal scientific training he had pre-eminently the scientific mind. No second-hand statement was good enough for him. In the preparation of *The Handbook* even the authority of eminent names was not sufficient; nothing was to be accepted at secondhand on which it was at all possible to secure original data, and everything had to be checked and verified if it was at all practicable. And if there were occasions when this extreme caution seemed almost excessive, it was the best possible safeguard against that all too common phenomenon, the perpetuation of mistakes through the prestige of names or too easy acceptance of the printed word.

Equally impressive was the trouble he would take to investigate records of rarities submitted to *British Birds*. His famous book-plate with the legend "What's hit's history and what's missed's mystery" perhaps expressed the scepticism of the collector more uncompromisingly than he would have done later in life, for he was, at least in his mature years, an extremely good judge of the possibilities, as well as the limitations, of field identification. From a combination of natural aptitude and long experience, probably no one was more expert in sifting sight records and in fastening on critical points in identification or extracting them from observers without asking leading questions. Here again there have been occasions when his caution has been thought by some—chiefly the disappointed would-be recorders themselves—to be almost excessive, but it will be generally conceded that it is infinitely preferable that a few possibly correct observations should be rejected as not fully proved than that dubious records should gain currency. Moreover it will bear stressing that his natural caution was reinforced rather than otherwise by his experience over many years of the actual vagaries of perfectly honest observers in matters of identification, and it has had the salutary result that extraordinarily few records which were in fact erroneous have found their way into *British Birds*.

All his ornithological correspondence was characterized by an equal thoroughness, and various correspondents have testified—as indeed probably few could do better than the writer—to the astonishingly full and painstaking way in which, in the midst of a busy life, he contrived to answer enquiries or to discuss matters of mutual interest in his letters. The personal interest in each writer's experiences and problems which he managed so effectively to convey in his frequently long and almost invariably hand-written letters, and his obvious sincerity and integrity, undoubtedly contributed to his editorial success and gained him the confidence and confidences of ornithologists of all varieties of outlook.

Like Jourdain, though with a completely different temperament and manner of approach, he was particularly successful and sympathetic with the younger generation. While others occasionally fancied him—quite wrongly—a trifle austere until they got to know him, young people nearly always made friends with him at once and were quick to appreciate his kindly encouragement and advice; they soon felt at home with him, for he was never patronizing.

In his quiet way he was an excellent companion amongst people of kindred interests, and his kindly, frank and upright personality endeared him to a wide circle of friends, including a number who knew him only through correspondence. He had a naturally serene manner, except when something which he thought unjust or vexatious irritated him; I have known him

"flare up" for a moment at the mere recollection of an annoying experience abroad, in a way which was really laughable to anyone knowing him well. Naturally unassuming, with a dislike for speaking in public, he avoided doing so more than he could help, but many will remember the dinner of the Ornithological Congress in Oxford, when, though it is said to have cost him sleepless nights beforehand, he astonished many of his friends by the most admirably witty and appropriate little speech, exactly right for the occasion, which has fortunately been preserved in the Congress Proceedings.

He joined the British Ornithologists' Union in 1897 and the British Ornithologists' Club at the same time. He was Honorary Secretary and Treasurer of the Club from 1904 to 1914 and Chairman from 1924 to 1927, and President of the Union from 1933 to 1938. On his retirement from the latter office he was presented with the Salvin-Godman Gold Medal, the highest award the Union can bestow. He also served for a time on the B.O.C. Migration Committee and from 1922 to the time of his death he was a member of the B.O.U. List Committee. He was made an Honorary Fellow of the American Ornithologists' Union in 1928.

He was one of the prime movers in the establishment of the British Trust for Ornithology for the promotion of field studies on birds. For some years he was a member of the Council and took the greatest interest in its work. The transference of the Ringing Scheme to the Trust has already been mentioned. In 1933 he arranged with the Trustees of the British Museum for the purchase of his collection of skins for the sum of £1,500, and, with the exception of £100, which he retained for the development of his bird reserve at Gracious Pond, presented the whole proceeds to the Trust as a capital endowment. Recently, he explained, he had not been able to make that full use of the collection which he would consider justified him in retaining it and "as I have long regarded the collection as belonging to ornithology and not as personal property I sought some means to benefit our science in some way by it." This munificent and self-sacrificing act was in keeping with his lifelong devotion to the cause of ornithology.

Writing in 1932 of the retirement of Hartert and the sale of the Tring collection Witherby observed that with these events an epoch might be said to have closed. He himself might be said with equal justice to have bridged two epochs, that to which reference has just been made and the other near whose beginning we now stand, in which, to quote *The Handbook*, "the main emphasis is and will continue to be on the living bird and its problems." To both he made outstanding contributions and in both he was a respected and well-loved figure. It will generally be agreed that he contributed more than any other single man in modern times to the advancement of the study

of British birds, and no more appropriate conclusion to this memoir could be given than his own concluding words in returning thanks for the award of the Salvin-Godman medal:

"And finally I come to the birds. . . . What should we do without them. How can one help studying such wonderful and fascinating creatures. After months of toil in the museum or in the study you may sometimes wonder if it is really worth while. But you have only to go outside your door or, indeed, to any part of the world, and watch the birds themselves, and you are quickly reassured that any labour to find out more about them is well worth while. And there will always be more to learn, not only for us, but for those to come—for the half has not been told.

"The best way I can thank you, Mr. President and Members, for this great honour you have done me—far better than any feeble words of mine—is to go on working at our beloved birds to the end."

And this, in fact, is what he did.

A SELECTED LIST OF THE ORNITHOLOGICAL WRITINGS OF H. F. WITHERBY.

I am indebted to Mr. N. B. Kinnear for the loan of a copy of the list of Witherby's published work prepared for the *Ibis* at the British Museum (Natural History) and to Mr. W. B. Alexander for assisting in the selection and for checking the references.

- 1894. *Forest Birds: their Haunts and Habits.*
- 1896. A Fortnight with The Birds of Connemara. *Irish Nat.*, V, pp. 1-5.
- 1899. Two Months on The Guadalquivir. *Knowledge* (in five parts).
- 1900. The Birds observed in The Kola Peninsula, Russian Lapland. *Ibis*, pp. 475-492.
- 1901. An Ornithological Expedition to The White Nile. *Ibis*, pp. 237-278.
- 1902. *Bird Hunting on The White Nile.*
- 1903. An Ornithological Journey in Fars, S.W. Persia. *Ibis*, pp. 501-571.
- 1905. Letter on Utility of Trinomials. *Ibis*, pp. 140-141.
Notes on a small Collection of Birds from Algeria. *Ibis*, pp. 179-199.
A Collection of Birds from Somaliland. *Ibis*, pp. 509-524.
- 1906. *Cinclus cinclus persicus*, subsp. nov. *Bull. B.O.C.*, XVI, pp. 71-72.
- 1907-1909. The More Important Additions to our Knowledge of British Birds since 1899. (With N. F. Ticehurst.) *Brit. Birds*, I and II (20 parts).
- 1907. A Collection of Birds from Western Persia and Armenia. *Ibis*, pp. 74-111.
- 1908. *Pyrrhula pyrrhula caspica*, subsp. nov. *Bull. B.O.C.*, XXIII, p. 48.
The Spread of The Little Owl from The Chief Centres of its Introduction. (With N. F. Ticehurst.) *Brit. Birds*, I, pp. 335-342.
"Hen-Harrier" nesting in Surrey. (Shown to be Montagu's Harrier). *Brit. Birds*, I, pp. 351-354.
The Birds of Fair Isle. *Brit. Birds*, I, pp. 381-384.
Incubation-Periods in Sea-birds. *Brit. Birds*, II, pp. 64-66.
The Levantine Shearwater in British Waters. *Brit. Birds*, II, pp. 206-208.

- 1909-1937. Reports on the Progress of the "British Birds" Marking Scheme. *Brit. Birds*, III-XXX.
- 1909-1910. Sequence of Plumages in British Birds. (With C. B. Ticehurst.) *Brit. Birds*, III and IV (six parts).
- 1909-1910. The Irruption of Crossbills. *Brit. Birds*, III and IV (several parts).
1910. A Collection of Birds from the South Coast of the Caspian Sea and the Elburz Mts. *Ibis*, pp. 491-517.
- 1910-1937. Reports on the Recovery of Marked Birds. *Brit. Birds*, III-XXX.
1910. Recent Records from Staffordshire, Warwickshire and Worcester. (With F. C. R. Jourdain.) *Brit. Birds*, IV, pp. 104-112.
1911. The Irish Jay: *Garrulus glandarius hibernicus*, subsp. nov. (With E. Hartert.) *Brit. Birds*, IV, pp. 234-235.
- The 1909 Irruption of the Crossbill as observed in the British Isles. (With C. J. Alexander.) *Brit. Birds*, IV, pp. 326-331.
1912. *Luscinola pryori sinensis*, subsp. nov. *Bull. B.O.C.*, XXXI, pp. 11-12.
- The 1912 "Wreck" of the Little Auk. *Brit. Birds*, V (three parts).
- Migration Notes from Holy Island, Northumberland, Autumn, 1912. *Brit. Birds*, VI, pp. 202-210.
- A Hand-List of British Birds, with an Account of the Distribution of each Species in the British Isles and Abroad.* (With E. Hartert, F. C. R. Jourdain and N. F. Ticehurst.)
- Systematic Notes on a Collection of Birds from the Mediterranean made by Commander H. Lynes, R.N. *Ibis*, pp. 121-187.
1913. The British Black Grouse, *Lyrurus tetrix britannicus*, subsp. nov. (With E. Lönnberg.) *Brit. Birds*, VI, pp. 270-271.
- Barrow's Goldeneye and The common Goldeneye. *Brit. Birds*, VI, pp. 272-276.
- The Sequence of Plumages of the Rook: with Special Reference to the Moults of the "Face." *Brit. Birds*, VII, pp. 126-139.
- Migration Notes from Holy Island, Northumberland: Autumn, 1913. *Brit. Birds*, VII, pp. 167-169.
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- The Dusky Warbler in Orkney: A New British Bird. *Brit. Birds*, VII, pp. 220-223.
- Ringling Birds in Hungary: A New and Valuable Method. *Brit. Birds*, VIII, pp. 63-66.
- 1915-1917. The Moults of the British Passeres, with Notes on the Sequence of their Plumages. *Brit. Birds*, IX-XI (eight parts).
1916. Some Birds New to the British List. (With H. W. Ford-Lindsay, T. Parkin and J. B. Nichols.) *Brit. Birds*, IX, pp. 197-208.
1917. Some Results of Ringling Song-Thrushes, Blackbirds, Lapwings and Woodcock. *Brit. Birds*, X, pp. 215-224.
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- 1919-1924. *A Practical Handbook of British Birds.* (With E. Hartert, A. C. Jackson, F. C. R. Jourdain, C. Oldham and N. F. Ticehurst).
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- Notes on the Nestling-Downs of the British Hawks. *Brit. Birds*, XIV, pp. 154-155.

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1921. Notes on British Records of the Spotted Eagle and Steppe Buzzard and on the British Tawny Owl. *Brit. Birds*, XIV, pp. 180-183.
The British taken Examples of the "Levantine" Shearwater. *Brit. Birds*, XV, pp. 151-153.
1922. The White-billed Northern Diver as a British Bird. *Brit. Birds*, XVI, pp. 9-12.
Notes on Birds from Northern Spain and Description of *Dryobates medius lilianæ*, subsp. nov. *Bull. B.O.C.*, XLII, pp. 47-49.
Nestling Plumages of Owls. *Ibis*, pp. 219-220.
Results of a Collecting Trip in the Cantabrian Mountains, northern Spain. *Ibis*, pp. 323-345.
1923. Notes on the Common Guillemot: a new British Form. *Brit. Birds*, XVI, pp. 323-324.
An Ornithological Trip to Central Spain and Description of *Cyanopica cyanus gili*, subsp. nov. *Bull. B.O.C.*, XLIII, pp. 73-74.
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The Breeding of the Common Snipe in the Iberian Peninsula. *Bull. B.O.C.*, XLV, pp. 25-26.
1925. The Nestlings of Some Rarer British Birds. *Brit. Birds*, XIX, pp. 68-70.
- 1926, '31, '34. Aves Anilladas capturadas en España. *Bol. Soc. Españ. Hist. Nat.*, XXVI, XXXI & XXXIV.
1926. The Distribution of the Southern and Northern Guillemots in Great Britain. *Brit. Birds*, XIX, p. 274.
Some New British Birds. *Brit. Birds*, XX, pp. 11-16.
1927. The Nestlings of Some Further Rare British Birds. *Brit. Birds*, XXI, pp. 50-51.
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1928. A Transatlantic Passage of Lapwings. *Brit. Birds*, XXII, pp. 6-13. and 43.
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The Birds of Central Spain, with Some Notes on Those of South-East Spain. *Ibis*, pp. 385-436 and 587-663.
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- 1931-1939. Movements of Ringed Birds from Abroad to the British Islands and vice versa. (With E. P. Leach). *Brit. Birds*, XXV-XXXIII (ten parts).
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The January-February Influx of Grebes and Divers. *Brit. Birds*, XXX, pp. 370-374.
- 1937, 1940. Additions and Alterations to the British List. *Brit. Birds*, XXXI, pp. 7-13, and XXXIII, pp. 2-3.
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DRUMMING OF THE GREAT SPOTTED WOODPECKER

BY

N. D. PULLEN.

IN a footnote on p. 284, Vol. ii, *Handbook of British Birds* attention is drawn to the claims made by some writers that the drumming sound produced by woodpeckers is vocal in origin. This claim, in the absence of any direct proof of the contrary merits serious attention, and it was in order to disprove it, if possible, that experiments to be described were carried out.

The arguments for the vocal method appear to be as follows :—

- (a) Some observers claim to have heard the sound whilst the bird being watched remained quite still.
- (b) More energy than the bird can provide would be required to produce a mechanical noise audible up to a quarter of a mile.
- (c) Why, if mechanical, *i.e.* produced by blows with bill, are no indentations or marks to be found at the drumming point.

Against these is the almost overwhelming evidence that rapid vibration of the head and bill occurs whenever the drumming noise is produced; therefore the bill must be hitting the wood or other surface being “drummed.”

The conclusion that the bill and the wood make contact is unsound unless supported by direct evidence, other than visual, which at the frequency used is distinctly unreliable. If, for instance the noise was vocal, necessitating for its production rapid movements of the throat muscles, then whilst the mass of observers would still be right regarding the coincidence of movement and noise they would be quite wrong in their conclusion or assumption that the bill must hit the wood at the end of each stroke. It is obvious, therefore, that before other questions can be answered, actual contact must be proved or disproved, and this was done in the early part of 1943. It was decided that if the bird hit the branch then it should be possible to pick up the sound of the tapping by using a suitably constructed microphone inserted in the tree.

For the experiment a microphone was constructed consisting of a stout wooden holder, shaped like a wine glass minus the foot with a sensitive button microphone fixed to the bottom of the bowl and sealed in with a closely fitting lid, the stem of the holder being sufficiently robust to enable it to be fitted firmly into a hole in the tree trunk bored for this purpose. The apparatus was completed by a small battery and transformer, a pair of headphones and about 50 yards of cable. Preliminary tests carried out on a live oak tree showed that small pieces of wood thrown into the tree to a height of 20 feet or so could be heard distinctly hitting the branches as they fell, and on windy days a tinkling sound produced by the smaller branches hitting each other was sufficient to mask any other noise. It should be mentioned that the microphone when sealed in its container was quite insensitive to air-borne sounds unless the air gap was less than two inches or so. The actual test was carried

out on a dead tree situated in a small wood. The drumming point is near the end of a broken bough 25 feet from the ground, the surrounding bushes, etc., providing cover at about 40 yards distance, from which the selected branch could be watched.

The first "drum" was a disappointment, as the bird arrived, drummed and left, before the 'phones had been adjusted; the second and third attempts were, however, successful. Immediately the head movement began, which could be seen, a rapid tapping sound arrived via the headphones, and at almost the same time could be heard the usual air-borne sound, with this difference: the sound in the 'phones was a series of sharp taps of a rather wooden tone, quite distinct and loud at first, but diminishing in clearness and intensity towards the end. The air-borne sound, being partly muffled by the ear pieces, was less clear, the noticeable part being a distinct but slight pause between the arrival of the 'phone signal and that through the air, the interval, as far as could be judged, being equivalent to about two beats. Drumming lasted for about one second each time, the bird using the same spot or very close to it. An attempt to count the strokes was found to be very difficult, the nearest estimate being 10 to 12; it was certainly not as low as 5 nor as high as 20. This result agrees very well with other estimates of 8-10, but more results would be required before any decision could be reached regarding the general use of this frequency.

The first part of the problem could now be considered as solved, definite evidence, other than visual, having been obtained that the bird's bill makes actual contact with the surface. The second part dealing with the particular type of noise produced can be answered if it is shown, as it probably will be, that the frequency of the blows is constant or only varies between small limits. Accepting this as a fact, all the bird has to do is to find a spot on a dead branch or other object where blows struck at its own frequency, *i.e.* about 10, will bring that object into resonance. This theory requires that the tone shall vary according to the type of object struck, *e.g.* wood or metal; it also limits the bird's choice to a few particular spots. That both of these happen is well known. How the spots are found does not appear to be known. The bird may know that dead branches free from bark are likely or desirable places, but after that it can only proceed by trial and error. No doubt such exploratory work has been observed without the observer's realising its object.

The theory also furnishes an explanation for the absence of marks at the drumming point and the apparent lack of power on the part of the bird. In order to produce vibration of sufficient amplitude to give the desired volume of sound it is only necessary to deliver taps or light blows at the correct rate for a certain time. The bird can therefore afford to expend its energy in maintaining a uniform speed, and provided it can keep it up for the required time the weight of the blows can be very light, certainly much less than would be necessary to damage the surface of the drumming board.

NOTES.

CHAFFINCH MIGRATION ON THE SOUTH-WEST COAST.

FROM October 22nd, 1943, to the end of the month I was staying at Vention, midway between Woolacombe and Baggy Point, N. Devon. Except on the 23rd, which was warm and windless, the weather was stormy and cold with a strong S.W. wind. On every day except the 23rd migrants were passing, flying low to the S.W. following the coast-line, some of them crossing the bay. From local information the movement had already been in progress for ten days before the 22nd. Starting in the early morning, it was at its height up to 9.0 a.m., and then gradually diminished towards noon and ceased about 1.0 p.m. At its strongest, flocks of ten to a hundred birds were passing every half minute. In the afternoons the passage was resumed, though in smaller volume up to dusk, the flocks being rather larger, but the intervals much longer. Towards the end of the month the movement slackened, but was each day well in evidence for an hour or so from 8.0 a.m., with a few birds passing on and off all day. About 75 per cent. of the migrants were Chaffinches (*Fringilla cælebs*); Greenfinches (*Chloris chloris*), Starlings (*Sturnus vulgaris*) and Sky-Larks (*Alauda arvensis*) formed the bulk of the remainder, though a few small flocks of Great Tits (*Parus major*), one of Lapwings (*Vanellus vanellus*) and a single Sparrow-Hawk (*Accipiter nisus*) were seen.

I noticed the same movement of Chaffinches at about the same date in 1942, but have mislaid my notes about it, and Mr. Mitchell Hedges tells me that he has seen it for the past ten years. Mr. E. W. Hendy, who lives at Porlock, writes in answer to my enquiry that he has never noticed a Chaffinch migration along the Somerset coast, although there is occasionally a noticeable increase of Chaffinches in the neighbourhood in October, so that there can be little doubt that the birds observed at Vention had crossed direct to the N. Devon coast from S. Wales.

D. A. BANNERMAN.

[Dr. Bannerman's observations are welcome, for little has been recorded of this late October "finch migration" on the west coast. The dates and flight direction fit in well with the few recorded observations from Bardsey Id. and Skokholm, but there are many gaps along the route that require filling in. There can be little doubt that the Chaffinches are passage migrants of continental origin on their way south.—EDS.]

FIVE SINGING REDWINGS IN SCOTLAND.

THE writers, between them, heard five Redwings (*Turdus musicus*) singing in Scotland between April and June in 1943. Both the thrush-like pre-mating song and the other song, which in Lapland is heard during incubation, were heard. This latter consists of a few clear, fluty notes on a descending scale followed by an unmusical trill. Both are described in *The Handbook* (Vol. ii, p. 122). Morley has already recorded the first of these birds (*antea* 37, p. 17). On April 13th she heard a Redwing singing the thrush-like song in a row of apple trees on the Isle of Tanera off the west coast of Ross.

On May 22nd, again on Tanera, a Redwing appeared alone in the same trees and sang the "nesting" song.

On May 23rd and 25th Venables heard a Redwing singing this "nesting" song from an open stand of full-grown spruce and beech trees in the vicinity of Rothiemurchus Forest, Inverness. On May 26th two birds were singing the same song here within earshot of each other—one on the top of a high spruce and the other on the top of a high beech. They were watched for some time, but no mates were seen. Dense undergrowth was present over parts of the area which would have afforded excellent cover for nests. Unfortunately he had no time for a prolonged search.

On June 16th Fisher, in N. Sutherland, heard a Redwing sing the thrush-like song for a few moments and then break off into the "nesting" song. The bird was in a stand of old birch and rowan with newly-planted conifers forming a shelter belt. He and P. Bicknell were able to spare only an hour on searching for a possible nest and they were unsuccessful.

All these birds were identified by sight as well as by song.

JAMES FISHER.

AVERIL MORLEY.

L. S. V. VENABLES.

LATE DRUMMING OF GREAT SPOTTED WOODPECKER.

EVIDENTLY the Great Spotted Woodpecker (*Dryobates major anglicus*) does at times drum between mid-May and the end of December—the period left blank in *The Handbook* table.

To Mr. J. H. Owen's October records (*antea*, p. 160) I can add early December. On December 4th, 1943 I heard one drumming repeatedly in Marbury Park, near Northwich, Cheshire and saw the bird, and was told by a farmer that another was drumming in a covert near my house on the same afternoon.

Mr. J. H. Bell tells me that he heard one drumming at Styal, Cheshire on June 11th, 1942; he did not see the bird but concluded it was a Great Spotted and not a Lesser Spotted Woodpecker, as he had never known the latter to occur there.

A. W. BOYD.

LITTLE OWL HOVERING.

AT 11.15 p.m. (D.S.T.) on July 7th, 1943, I was walking across a meadow by the Windrush at Bourton-on-the-Water, Gloucester, when I saw a Little Owl (*Athene noctua vidalii*) hovering about 30-40 feet above ground. It hovered in quite the Kestrel fashion for about 15 seconds, after I saw it, then it dropped like a stone; I ran forward, when it rose and flew to a stone wall on the skyline and called, but as far as I could see carried no prey.

The place was open and the grass long so it had no place to sit and survey that particular bit of ground. I have never before seen even a suspicion of hovering and the Little Owl is very common here.

A. G. TAYLER.

FEMALE PEREGRINE INCUBATING BESIDE DEAD
PREDECESSOR.

I WAS much interested in C. & D. Nethersole-Thompson's notes on nest-site selection, particularly those on the Peregrine Falcon (*antea*, p. 108), with examples of substitute females using the same eyries as their predecessors, as rather an interesting case of this kind came my way.

On May 10th, 1942, in the mountains of Merioneth, North Wales, Squadron Leader N. J. Durrant and myself saw a male Peregrine (*Falco p. peregrinus*) over a small cliff. From a small overhanging grass-grown ledge we flushed the female. On climbing to this ledge we found two eggs in a scrape close beside a dead female Peregrine. We removed the latter, which was quite warm on the side near the eggs so that the sitting-bird must have been actually touching the dead one.

There was another scrape under the dead bird, which had been dead three weeks at least and probably longer and was a grand mature bird. I imagine that the bird had been shot and crippled and had gone back to the eyrie and died on the scrape, the cock getting a fresh mate, which laid beside the dead bird. We attempted to dissect to see if she had laid but she was too decomposed.

A. G. TAYLER.

LITTLE EGRET IN CORNWALL.

ON November 10th, 1943, I had an excellent view of a Little Egret (*Egretta g. garzetta*) in company with an immature Spoonbill (*Platalea l. leucorodia*) at Hayle Causeway, near St. Ives. It was observed at about 30 yards range, with glasses, in an excellent light. The fine, sharp, black bill and black legs and, when it flew, the yellow feet were well seen, and the whiteness of the plumage was remarkable. It had also a slight crest. The two birds kept close together, the Egret taking the lead when they flew. The Egret was first reported by Col. Bolitho, who saw it somewhat doubtfully on the 8th and had an excellent view with glasses on the 9th. The main haunt of the two birds seemed to be a green field or water-meadow, between the main road and the railway embankment, but they flew down on to the estuary when disturbed; they did not appear either unduly nervous or unnaturally tame. HILDA M. QUICK.

[We have received a letter to substantially the same effect from Dr. R. H. Blair, who also had a close view of the birds on November 9th. Unfortunately all such birds as Egrets are nowadays under a certain suspicion of having escaped from captivity, a suspicion which is increased in the present instance by the date. Nevertheless we are informed that none have escaped from the London Zoological Gardens or Whipnade, which are perhaps the most likely sources (though by no means the only ones) and it may be admitted that there are probably fewer in captivity after four years of war than under peace-time conditions. Miss Quick informs us that the Egret was still about in early January, 1944.—EDS.]

LITTLE RINGED PLOVER IN EAST BERKS.

ON July 8th, 1943, I noticed the arrival at Ham Fields Sewage Farm of a small wader and approached to within 15 yards of it. It was a Ringed Plover, but of a different build from *Ch. h. hiaticula*, smaller and longer bodied, with longer, dirty yellow legs, buffish brown upper cheeks and crown merging into white lower cheeks and throat. My suspicions that it was a juvenile Little Ringed Plover (*Ch. dubius curonicus*) were confirmed when it rose with a thin high note and definitely showed no wing-bar. This is the first record for Berkshire.

H. N. MONEY-COUTTS,

MARSH-TITS ATTACKING CYPRESS CONES.—Mr. A. Roebuck writes on December 30th, 1943, that for the past three weeks a few Marsh-Tits (*Parus palustris dresseri*) have been busy on a tall cypress (*Cupressus lawsoniana*) at Sutton Bonnington, Nottinghamshire, breaking open the cones and apparently feeding on the seeds. Examination of the cones on the trees has revealed no sheltering insects inside them.

LATE SPOTTED FLYCATCHER IN DORSET.—Mr. J. R. M. Tennent informs us that on November 23rd, 1943, he observed a Spotted Flycatcher (*Muscicapa s. striata*) at Blandford, Dorset. It was perched on the lintel of a window, whence it made sallies after insects, and was very well seen, so that there was no possibility of error. The latest date given in *The Handbook* is October 31st.

BLACK-TAILED GODWIT IN ANGLESEY.—In connexion with Mr. S. V. Wild's record of a Black-tailed Godwit (*Limosa l. limosa*) in Anglesey (*antea*, p. 160), Major A. W. Boyd informs us of another seen by him at Llyn Coron, Anglesey, on July 6th, 1939. Another record by Major Boyd will be found in Vol. xxxv, p. 363. It seems to be now sufficiently established that this species is at the present time of not very rare occurrence in North Wales.

LITTLE GULLS OFF THE E. COAST.—Mr. F. M. Firth writes that he came across a number of Little Gulls (*Larus minutus*) off the E. Coast during the late spring and autumn of 1943. All were immature birds showing the dark stripe across the "shoulder" of the wing. On May 23rd five or six were sitting on a buoy about five miles off the Humber mouth. Several were seen in the Firth of Forth area during August and September, particularly off the Isle of May. On September 3rd he had very close views of two on the beach near Largo, Fife and on the 6th a party of eight were off the Isle of May, where single ones were also seen on various dates in October up to the 23rd.

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MAJOR A. W. BOYD.

It is with great satisfaction that I am able to announce that Major A. W. Boyd has agreed to assist in conducting *British Birds*. Major Boyd is well known as a field ornithologist of great experience and I am sure that all our readers will welcome this accession to our staff. B.W.T.

NEST-CONSTRUCTION BY BIRDS

BY

LT.-COLONEL B. H. RYVES.

IN the present paper, which is prompted by a realization that published matter on the subject is extraordinarily meagre, I shall endeavour to outline a general picture of the one phase of the breeding cycle of birds—nest-construction—which for absorbing interest cannot, I believe, be surpassed by any other.

To describe the many and varied types of nests built by the varied species, whose requirements differ to a marked degree, is outside the scope of this paper. Indeed, it would almost be necessary to write a book and devote a chapter to each species or at least to each group of species. This will be readily understood when one considers that, exclusive of geese, ducks and game-birds, over 160 species have been recorded to breed in Great Britain.

Before discussing such points as the use some birds make of certain materials and their well-defined purposes, and the essential features of a nest, one or other or all of which must apply to the nest of every species, I propose at the outset (after a few introductory remarks) to approach the subject of the rôles of the sexes in constructional operations and then to follow with an account of the actual procedure of building (with as precise particulars as it is possible for me to give) under a few species, each providing a typical illustration of the peculiar part taken by each sex. At the close of each illustration will be found some general notes attempting to amplify it.

It must be obvious that the close study of a bird at work is beset with many difficulties. Although many birds lose a good deal of their innate shyness when absorbed in their task and permit closer human approach than at ordinary times, it is extremely hard to follow their rapid and intricate actions. In any case one cannot see exactly what is being done within the nest when only a beak or tail is visible. However, by connecting observed movements with changes at the nest after a spell of work, some of the movements can sometimes be interpreted with a measure of accuracy. At the same time a sense of bewilderment pervades one's faculties, enhanced, no doubt, by the knowledge that no human being is capable of reproducing the amazing structure even with tools that might specially be fashioned for the purpose. One finds oneself constantly wishing that the bird would repeat its operations again and again in the manner of a slow-motion film.

RÔLES OF THE SEXES.

I have little hesitation in saying that there is no phase in nest-construction that we less understand or more misunderstand than the parts played by the sexes—none certainly that calls more urgently for clarification.

To start with, I submit that it is only a specially inherited craft that enables a bird to build its specialized nest. All birds, regardless of sex, do not inherit it and it cannot be acquired except, perhaps, in the course of evolution. If this view be accepted, it is reasonable to argue that a bird that actually builds and one that only provides materials are performing entirely distinct functions which should not be confused. If I may be allowed the metaphor, the former is a craftsman and the latter a navvy. It thus logically follows that the fact of seeing a bird with materials in its beak does not justify the assumption that it is a craftsman until proved to be so by its subsequent actions at the nest.

From recorded observations in the field we are, however, justified in pronouncing that nearly every bird falls into one or other of four clearly defined categories though, with our present state of knowledge, we cannot place every species in its appropriate place. The consummation of so desirable an end will not be reached without an immense amount of careful research.

Category 1.—Species in which both sexes build.

- (a) Species in which both sexes take a full and equal share (namely both inherit the craft) ;
- (b) species in which the male builds so-called "cocks' nests."

Category 2.—Species in which the female alone builds and the male alone provides the materials.

Category 3.—Species in which the female alone builds, the male taking no consistent part.

Category 4.—Species in which the female alone builds and both consistently provide materials.

[There are a few species, comparatively negligible in number, in which the rôles of the sexes in Category 3 are reversed. I have not placed these in a separate category in order to avoid multiplication and confusion.

I omit altogether those species which build no nest of any kind, not even a scrape.]

ILLUSTRATIONS.

(I) LONG-TAILED TIT (*Ægithalos caudatus rosaceus*) (*Category 1 (a)*).

The following case is, I think, fairly representative of the species. But, before giving details, I will describe in a nutshell the chief features of the birds' methods. Both birds appear to be equal partners throughout operations and no "master craftsman" is discernible between them. They work in unison as a single bird. Building normally begins when the sun is well up and continues, with intervals up to an hour for feeding, until the late afternoon. A whole day may be lost in really inclement weather, but a day seldom passes without an hour or two of activity. Each bird generally waits for the other to finish its job, the waiting one often becoming very impatient, but it is not uncommon to see them in the nest

together. All through operations they keep up a ceaseless chatter. Shifts at the nest are remarkably short in comparison with the lengthy stays of some other species. This, I suppose, is due to the extraordinary rapidity of their movements. Work is carried on from within the nest. An occasional feather is brought before the dome has been formed, but the bulk of feathering is done when the outer nest appears to be finished. Both birds begin roosting in the nest as soon as it has been domed. In the present case the pair were occupied for 27 days in completing their nest, but from other records secured, the period has been about 23 days. I may be allowed to record here that 73 days had elapsed from the commencement of building to the "fledging" of the young.

On March 10th, 1938, I watched a pair site-hunting and on the 11th they began building in my privet hedge, $4\frac{1}{2}$ feet above the ground. After three days constant work, fine lichens and cobwebs tightly woven round two twigs forming a V, and a small platform in the apex of the V, became clearly visible from a distance of six feet or so. These formed the framework and foundation of the final nest. As work progressed the weaving round the forks and the platform rose higher and thickened. It seemed to me that the weaving was accomplished by dexterous manipulation with the beak (from a later illustration it will be noted that the beak is but little used except for bringing materials). By the 19th the nest had assumed the shape of a shallow, open cup. From this point onwards the beak appeared to be less in use and body work came into play. A bird would subside on to the nest and proceed with a series of shufflings, twistings, turnings and gyrations. Sometimes the head would be lowered and the tail elevated. Suddenly a wing would shoot out here or there at an angle that gave the bird the appearance of being injured. On the 23rd I watched one bird tugging at a cocoon in the crevice of a tree and pulling out long strands of silk. Very fine lichens were now being collected from the trunk of an old willow and green moss was often in evidence in their beaks. On the 25th a dome was beginning to rise and the wall was distinctly higher on the side opposite to where the entrance hole eventually was built. The birds shaped the dome by pressing the felting inwards with their chins. When the dome became too high for them to continue this procedure they **butted** it upwards and inwards with the crowns of their heads. On the 29th the hole was discernible, the wall on its side having been built up to the level of the rest of the dome and, on the 31st, it seemed to have taken full shape. I could no longer see what was going on inside, but materials (chiefly moss) were still taken in, presumably to thicken and reduce the size of the cup. On April 3rd feathering was in full process and after the 6th building ceased and the nest appeared at last to be completed.

[It would appear to me correct to include in this category Swallow and House-Martin and, as expert diggers, Sand-Martin, Kingfisher, the woodpeckers and shearwaters.]

(2) WHITETHROAT (*Sylvia c. communis*) (Category 1(b)).

(a) On June 6th, 1931, I watched a solitary male commence building a nest which he completed on the 8th. The nest appeared to be a perfect one and I awaited the sight of an egg in it, but none was ever laid. Indeed, although the bird remained in the territory, constantly singing, for several days longer, no female ever materialized.

(b) On May 7th, 1935, after courtship and site-selection had been observed, I noted the commencement of building. Each bird took an equal share in the work throughout, selecting materials with meticulous care.

(c) Mr. T. J. Willcocks records (in *Cornwall Bird Watching and Preservation Society's Report for 1938*) the following instance:—
“On June 11th, 1938, a brood safely left their nest. On the 18th, a nest about 100 yards away, which I had found completely built some days before, held one egg. Had this nest been built by one of the birds while the other nest was in progress?”

[From (a) above, it is clear that the male of this species inherits building craft in full measure and can complete a nest entirely on his own. From (b) there is proof that the female also inherits the craft and that a pair's behaviour can simulate that of species in Category 1 (a). From (c) inferences may be drawn that need not be discussed here.

The only other species of my personal experience in which the male is a “craftsman” as proved by the highly skilled “cocks' nests” he constructs, is the familiar Wren (*Troglodytes t. troglodytes*). I do not care to discuss the species in this paper as I have not studied it widely enough to add any useful contribution to what has already been published (*cf. antea*, Vol. xxxiii, p. 302).]

(3) WOOD-PIGEON (*Columba p. palumbus*) (Category 2).

Although the nest of this pigeon has no adjuncts for comfort and the cup is very shallow, it is, in my experience, cleverly constructed and certainly resists buffeting by winds as well as almost any nest I know. The time taken to build it varies, but eight days is about the average. Normally, building takes place from late morning to early afternoon, say for three to four hours each day.

The pair usually huddle together on the selected site for several days before operations are actually commenced. When at last building does begin, the male leaves the female at her site and flies off to procure a stick, which he picks up from the ground or snaps off from a tree. He is meticulous in his choice and never carries more than one at a time, be it large or small. Having made his choice, he flies with it to the female and makes it over to her and then at once departs for another. Sometimes he places the stick in a certain position, stepping on or over his mate's back to do so, but he never remains at the nest. The female, being a clumsy and heavy bird, seems incapable of gyrating. Having moved the stick to a desired position she subsides low on to the nest and slowly rotates.

When the male ceases work he flies right away, but the female remains sometimes for hours. I believe that it is by this squatting for long periods that she consolidates and beds down the intertwined sticks and forms a shallow cup. Even after the nest is completed she continues to squat for some hours a day until an egg is laid. I should add that a crude lining is sometimes added, consisting of pine needles or dried weeds.

[Whether other pigeons should be classified in this category I do not know and I can find no records on their behaviour. The Common Heron apparently adopts procedure similar to that of the Wood-Pigeon.]

(4) GOLDFINCH (*Carduelis c. britannica*) (Category 3).

The nest, in my view, unquestionably ranks with those which are conspicuous for their architectural skill, such as the Long-tailed Tit, Chaffinch, Goldcrest and Reed-Warbler.

I shall not describe in detail methods of building because they are fundamentally similar to those of the Long-tailed Tit. The main difference is that the female alone constructs the nest. There are some minor differences that seem worth notice. Work is carried on at any time soon after sunrise to nearing sunset, with intervals, of course, for feeding, and the nest is completed in six to eight days. There is perhaps more susceptibility to inclement weather. Working spells at the nest are noticeably long. The weaving of materials—so far as I could interpret the builder's actions—seems to be accomplished more by a combination of beak and body movements than by the beak alone. Further, the bird appears to revel in long distance flights to procure materials which are equally available near at hand.

The male's reactions are shown by great excitement. He closely accompanies his mate on every foraging expedition, returning with her to perch nearby. While she is at the nest, he alternately sings and twitters and becomes very impatient when her stay is prolonged. When the female is ready, she quits with a peculiar call note which he answers as he darts off to join her. The first egg is not infrequently laid before the nest has been fully lined.

[Greenfinch and Bullfinch are among other species in which the male's behaviour is approximately similar.]

(5) MISTLE-THRUSH (*Turdus v. viscivorus*) (Category 3).

I give a second example under this category, partly to illustrate the difference in the male's behaviour—behaviour common to many other species to a greater or less degree.

Building operations are conducted from early morning to about mid-day; spells at the nest vary and are often quite lengthy. The female begins by depositing materials in sufficient quantity to form a loose platform. She then subsides on to them and by feet movements, shufflings and rotations, flattens and mats them together or forces them into cavities and crevices in the selected crotch (a substitution for weaving). Materials that do not fit in with each

other or their surroundings fall to the ground. Construction throughout is effected almost entirely by the body and chin work and complex movements I have already tried—however inadequately—to describe. The beak apparently is very little used. As the nest increases in size gyrations too increase and the wings come into much play. Sometimes the builder even seems to be standing on its head. When the nest is really bulky the whole structure is skilfully and securely consolidated by a thick plastering of wet mud, on which the lining is usually laid on the following day. The perfect symmetry of the rounded cup is not attained by any sort of planning or measuring. It takes form quite automatically through the bird's gyrations. Likewise the diameter and depth of the cup are entirely controlled by them. Where space is confined the walls may be thinner, but where space is excessive the difficulty is overcome by the walls being thickened until the cup assumes the correct dimensions that exactly conform to the size of the bird's body.

The male is generally somewhere in the vicinity but rarely in song, though he "churrs" vigorously when there is any threat of danger. He may occasionally visit the nest to inspect progress (*cf. antea*, p. 12) and—though I have never seen it—pick up a bit of material and toy with it or take it to his mate.

[I believe that the methods of building described above are fundamentally the same with most other species—that is to say body-work is the chief feature. Where advanced skill in craftsmanship exists, the use of the beak appears to come into greater prominence.

I think this category is the largest. From my own observations I include in it, without hesitation, the following species:—Greenfinch, Linnet, Bullfinch, Chaffinch, Corn-Bunting (*antea*, Vol. xxviii, pp. 2-26 and 154-164), Cirl-Bunting, Tree-Creeper, Great Tit, Blue Tit, Coal Tit, Spotted Flycatcher (*antea*, pp. 82-84), Goldcrest, Chiffchaff, Willow-Warbler, Song-Thrush, Blackbird, Stonechat, Robin, Hedge-Sparrow and Montagu's Harrier. There are, of course, many others.

The behaviour of the males of the above birds varies to a marked degree. Some, as already shown, closely accompany the females on their foraging expeditions. Some, like the Mistle-Thrush, are interested spectators, while others are scarcely in evidence at all (Blackbird, Robin, etc.). Others react to excitement by occasionally providing materials, but without any real attempt to build, and yet others by chasing the females (Chaffinch, Corn-Bunting, etc.); such males constitute a potential danger of erroneous classification in Category 4 below.]

(6) MAGPIE (*Pica p. pica*) (Category 4).

The following notes were obtained from a pair which bred in the tall pines close to my house for four successive years (always a new nest). Owing to the great height and other difficulties I failed to

discover the exact methods employed in building, but I learnt some interesting details.

The average time taken to complete the nest, which is surely a masterpiece in stick-craft and consolidation, was 20 days. Work usually started soon after light, eased off at mid-day and then ceased or became spasmodic until sunset. Each bird procured materials, the male I think most, but the female was the sole architect. Sticks were carried singly and some were so long that the birds had difficulty in reaching the nest with them. The nest became plainly visible after about six days of building. Mud-consolidation was commenced after about ten days, proceeded in conjunction with stick-work and lasted for several days. The last four days were occupied in lining the cup with a mass of fine rootlets. If the female was in the nest when the male arrived with a stick or mud (which seemed to be carried in the beak only), he would present it to his mate, who responded with a low growl, and fly off. If, on the other hand, she was absent, he would just drop the material in the cup. During operations the ground below was sometimes carpeted with rejected sticks, most of which were retrieved later.

[I would urge that great care should be exercised before placing a species in this category, as it might transpire that it actually belongs to Category 3. For myself, I am not prepared to list more than Raven, Rook and Chough, though I imagine that Category 4 is probably the second largest.]

It may be relevant here to draw attention to a peculiar habit of Great and Blue Tits (it may occur with other tits too). Eggs are laid among a mass of dishevelled moss, etc., and covered with fur or feathers. Only on the eve of incubation is the nest shaped and the eggs "dug up" from below and the fur placed under them. The heap of disordered materials has been transformed into a perfect nest with the eggs lying neatly exposed in a lined cup—surely an amazing bit of juggling.

(To be concluded.)

BLACK REDSTARTS BREEDING IN MIDDLESEX SINCE 1926

BY

G. W. CALVERT, R. S. R. FITTER AND R. W. HALE.

IT is now possible to publish full details of one of the most remarkable discoveries of recent years in British ornithology. For a period of fifteen years, from 1926 to 1941 inclusive, three pairs of Black Redstarts (*Phœnicurus ochrurus gibraltariensis*) nested regularly in the Palace of Engineering at Wembley, Middlesex. Our informant is Mr. C. Parish, a caretaker in the employment of the Wembley Trust since the closing of the Empire Exhibition in 1925.

It is worth recalling that in 1926 the Black Redstart was known to nest in only one other place in the British Isles, the locality on the South Coast—since revealed to be in Sussex—where the late T. A. Coward recorded one pair breeding in 1923 and 1924 and two pairs in 1925.

On the evidence of Mr. Parish three pairs of Black Redstarts nested in the Palace of Engineering at Wembley in every year from 1926 to 1941, and in 1937 a fourth pair also nested. The Empire Exhibition had ended in the year before they first nested, and according to Mr. Parish the Exhibition grounds in 1926 more or less reproduced the conditions of the blitzed areas in London at present, except that the buildings remained standing. The three annual nesting-sites were all always on similar breeze-slab ledges about 18 ft. above roller doors large enough to admit a lorry. The doors are protected by lofty porticoes. Two of the nesting-sites were above doors on the west side of the building, and the third was on the north side. It is interesting to remember that the pair which nested in Westminster in 1940 and 1941 also nested on a ledge above a doorway. The fourth pair that bred at Wembley in 1937 built its nest inside the building between three bolts on boiler foundations in the old power station, gaining access to it through some old ventilating shafts in the wall. The nests were all open ones like a Swallow's. Two broods were reared in each year, one in May and the second in the middle of July.

The Black Redstarts did not breed at the Palace of Engineering in 1942, when for the first time the roller doors beneath the ledges were in constant use. The Palace of Engineering is so large a building that up to 1942 the amount of work going on there did not involve the use of these doorways, so that the birds remained undisturbed. Black Redstarts were, however, heard by one of us (G.W.C.) at the Palace of Engineering in 1942. In 1943 there appear to have been no Black Redstarts at the Palace of Engineering, but one of us (R.W.H.) heard one singing in the Stadium on July 1st and 2nd. The public use of the Stadium has decreased proportionately to the increased use of the Palace of Engineering.

Now that we know that Black Redstarts have been breeding for so long unsuspected within ten miles of Central London, an interesting light is thrown on the possible origin of the Black Redstarts which appeared at South Kensington in 1927 and in various parts of Inner London in increasing numbers from 1936 onwards.

In view of the fact that Mr. Parish is not an ornithologist, one of us (R.W.H.) paid him a special visit to check the details of his account, while he has been known personally for some years by another of us (G.W.C.) We have no hesitation in stating that Mr. Parish is a completely trustworthy observer. He is familiar with wild birds and readily identified coloured plates of the Black Redstart from *The Handbook of British Birds* and Thorburn's *British Birds* as being the birds he had seen at Wembley, and which he aptly referred to as "red-tailed flycatchers." Moreover, in every year from 1937 to 1942 the Black Redstarts at Wembley were observed personally by one of us (G.W.C.), who is familiar with them on the Continent. In 1937 he was also shown one of the nests, after the young had left, by Mr. Parish, and in 1940 he actually saw some of the young when out of the nest. They kept very much to the top of the building, which has a roof area of 16 acres and is closely surrounded on two sides by trees.

The reason why this important record was not published before is that it was in fact brought to the attention of a leading ornithologist by one of us (G.W.C.) some years ago, but at the time—it was in 1937 and well before Black Redstarts began to breed regularly in London—it was considered so unlikely that it was not followed up.

BLACK REDSTARTS IN ENGLAND IN THE SUMMER OF 1943

BY

R. S. R. FITTER.

IN the summer of 1943 Black Redstarts (*Phaenicurus ochrurus gibraltariensis*) were present in eleven English counties, and nested in five of them; in 1942 they had been present in nine counties and nested in five. In 1943 no reports were received of Black Redstarts in Devon or Yorkshire, as in 1942, but first breeding records for Suffolk and Warwickshire were received. Altogether at least ten pairs nested in England in 1943, compared with six in 1942, and five pairs successfully reared second broods. It seems certain that the bird is still extending its range, and but for the restrictions on observation due to the war many more would probably have been reported. It is desirable that as soon as military conditions make it possible, all the towns on the south and east coasts of England should be thoroughly searched for Black Redstarts.

But for the illness and death of H. F. Witherby, this would have been a joint paper, as was the account published last year for the Black Redstarts in 1942. In fact, the bulk of the records for Black Redstarts occurring outside London had already been collected by Mr. Witherby before his illness took a serious turn.

In the following account, the records are first treated on a faunistic basis by counties, with the names of the observers responsible for the records in each county given in brackets. Subsequently the more interesting notes on breeding biology are briefly summarized. I am much indebted to the 67 observers whose notes have made this summary possible, and shall be grateful for their continued co-operation in 1944.

DEVON.

Burlescombe.—The pair that nested in 1942 was not seen during four days at Whitsun (A. Darlington).

HAMPSHIRE.

Portsmouth.—Mr. B. Vesey-Fitzgerald was informed of a bird present in Palmerston Road, Southsea, but Mr. D. J. Gunston could find no evidence of it.

Southampton.—Three singing males were present (C. Ingram, B. Vesey-Fitzgerald), one in a ruined church near the main street, where the 1942 bird was seen, one in a ruined garage behind the Central Station, and one in some ruined houses by the railway line at St. Denys.

SUSSEX.

Hastings and St. Leonards.—Two pairs present, one of which certainly nested in St. Leonards, and the other almost certainly in Hastings, where the cock was seen carrying food to an unidentified spot, the nest being probably destroyed. A cock singing in Wellington Place, Hastings, in April was probably on passage (D. H. Forman, Dr. N. F. Ticehurst).

KENT.

Dover.—Four pairs present in one very restricted part of the town, one pair being seen with a brood in early July; reported locally to have nested in the town for about ten years (Dr. G. C. Varley).

Medway area.—Mr. P. A. Rayfield was unable to locate any birds this year, but Brigadier H. H. V. Christie saw a pair with young in a chalk quarry overlooking the Medway near Rochester.

LONDON AREA.

Information has been supplied by the following observers:—P. A. Adolph, C. B. Ashby, S. Austin, Miss H. Barlow, A. J. Beamish, J. S. S. Beasley, H. Bentham, T. Bispham, P. A. Briggs, L. I. Carrington, S. P. W. Chave, Brig. H. H. V. Christie, Miss M. Curtis, C. Dolley, J. Fisher, R. S. R. Fitter, H. G. Gould, R. W. Hale, R. W. Hayman, A. F. C. Hillstead, F. J. Holroyde, O. Hook, E. J. Hosking, K. E. Hoy, W. P. Jobson, Miss L. J. Johns, Miss C. E. Longfield, Dr. G. C. Low, E. Mann, Sir P. Manson-Bahr, R. W. Mayo, Miss E. McEwen, D. H. Meares, D. W. Musselwhite, Col. G. S. Parkinson, E. G. Pedler, W. R. Philipson, W. S. Pitts, Mrs. M. Priestley, B. A. Richards, A. L. N. Russell, Col. R. Sparrow, W. J. L. Sladen, C. H. Walker, Prof. E. H. Warmington, S. Watson, H. F. Witherby.

City of London.—Three pairs nested, two of them bringing off two broods, and about eight other singing males were present. One pair nested in the Temple, another off Fetter Lane and the third in the Charterhouse. The Charterhouse brood of three was ringed on June 11, and one of these was picked up dead at New Southgate, Middlesex, 7-8 miles NNW, on July 26. It is not certain whether the family party of six seen in Bunhill Fields Burial Ground on September 10 and subsequently (E.G.P.) was one of the three known broods or a fresh and hitherto unrecorded one. What was possibly part of the same family party was seen by H.G.G., who found two immature birds in Aldersgate on October 23. Of the eight other singing males, two sang in the area between St. Paul's and Queen Victoria Street, two in Fetter Lane district, one in Serjeant's Inn off Fleet Street, two in the area bounded by Aldersgate, Cripplegate, Moorgate and Guildhall, and one in Mincing Lane.

Westminster.—A male was present throughout the summer in the Abbey precincts, and a second male and a female were possibly seen once or twice (A.L.N.R.). One singing on Charing Cross Station on April 23 was probably a passage bird (L.I.C.).

Bloomsbury.—Two singing males, one frequenting the area between University College and the University of London, and the other in Red Lion Square.

West and South-West London.—One sang intermittently near Earls Court Station in May and June (M.C.); one singing on a burnt-out garage in New King's Road, Fulham, on April 17 (R.W.H.); one singing near Ravenscourt Park Station on April 18 (J.F.). The Wandsworth site, where Black Redstarts nested in 1941 and 1942 was not visited in 1943 (H.H.V.C.).

Middlesex.—One singing on Wembley Stadium on July 1-2 (R.W.H.); see Calvert *et al.* (1944) for the previous history of Black Redstarts in Wembley.

East London and Essex.—One singing on a corrugated iron shed at Purfleet, April 20 (J.F.); one singing in ruined buildings in Plaistow, April 27 (P.M.-B); one singing in Surrey Commercial Docks, June 9 (S.W.); one singing on a wharf at the south end of the Isle of Dogs, July 15 (S.W.).

SUFFOLK.

Lowestoft.—Three pairs bred, all rearing two broods; one other singing male was present. This constitutes the first definite breeding record of the Black Redstart for Suffolk (F. C. Cook, E. W. C. Jenner, P. Roberts).

CAMBRIDGESHIRE.

Cambridge.—For the first year since 1939 there has been no definite proof of breeding in Cambridge. A pair spent the summer in the King's-Clare-Trinity Hall area, but no nest was found and they were never seen carrying food (*see* Harrison (1943) for the courtship of this pair). Three other singing males were present in the town, and a female was once seen (May 20) in the area of one of these, which frequented Trinity and St. John's Colleges (Miss H. Barlow, P. S. Burns, A. Darlington, J. G. Harrison, D. C. H. McLean).

WARWICKSHIRE.

Birmingham.—One pair nested 30 ft. up above the main entrance of the University, one or two young being reared; four infertile eggs, probably the second clutch, were removed in September, the nest having been relined. This constitutes not only the first breeding record for Warwickshire or any part of the Midlands, but the most inland and the northernmost (equally with Lowestoft) point in England yet reached by breeding Black Redstarts (M. Abercrombie, W. E. Groves, R. C. Panton).

LEICESTERSHIRE.

Leicester.—A male seen in Barkby brickyard, four miles from Leicester, on April 28th was not seen again, and must have been a passage bird (W. H. Barrow, A. E. Jolley).

SOME NOTES ON THE BREEDING BIOLOGY.

Arrival and Departure; Song-Period.

The Black Redstart is at present a summer visitor in its breeding haunts in England. As its presence is usually detected by its song, the known dates of arrival and departure roughly correspond with the song-period. The periods of song given in *The Handbook* for West Germany are from the end of March to early July, and again from late August to early October. These appear roughly to be the song-periods of British birds, though snatches of song can be heard right through July and August, and sometimes later than early October. Some birds do not arrive at the nesting-sites till quite late in April, or even early May, while many birds heard singing in April do not stay. Young birds were seen near the St. Leonards nesting-site till November (N.F.T.), and one was singing in St. Andrew Street, Holborn Circus, London, as late as December 3rd (W.S.P.).

Mr. Howard Bentham has kindly supplied details of the song-periods of three males which he had under close observation:—

1. Sang from April 1st to July 29th, and again from August 24th to October 15th. This bird was not seen after October 20th.

2. Sang from May 13th to July 29th ; was heard in weak song for about half a minute on the evening of August 9th and in full song on the early mornings of September 29th and 30th. This bird stayed until October 8th.
3. Sang from May 17th to July 29th. This bird was an unattached male and was not seen after July 29th.

Nos. 1 and 2 were both breeding birds, two broods being reared in each case. Nos. 2 and 3 may have arrived a week or two in advance of the dates when song was first heard, but were certainly much later in reaching their respective haunts than No. 1.

Plumage of Breeding Males.

Out of six breeding males whose plumage was recorded, only two (Lowestoft, Fetter Lane) had the conspicuous white wing-patches of the full adult plumage. The Temple male had no white on the wings till after the autumn moult, the Birmingham and St. Leonards birds had only very small and inconspicuous white patches on the wings, and one of the Lowestoft birds was described as "only slightly greyer than the female." The Cambridge bird that mated but apparently did not breed had a well-marked white wing-patch, and so did the Cambridge unmated males. The unmated male in Serjeant's Inn was almost indistinguishable from a female in plumage.

Hatching and Fledging Periods.

Data are available for only two nests in any degree of completeness. One of the Lowestoft pairs was building on May 1st ; the first egg was laid on May 9th ; the clutch completed on May 13th, hatched on May 26th, and young left nest on June 11th (F.C.C.). The Charterhouse birds were building on April 29th, the first egg was seen on May 3rd, there were three eggs (full clutch four) on May 8th, and the hen began to brood on May 11th ; the young had hatched by May 31st and flew on being ringed on June 11th (C.H.W.) This gives 13 days for incubation and 16 for fledging at Lowestoft, and 31 for both combined at Charterhouse, compared with *The Handbook's* figures of 12-13 days and 16-18 days respectively.

Number of Young Reared.

Out of seven first broods for which information is available, one consisted of 1 (possibly 2) young, one had 2, one had 3, four had 4 and one had 5. Out of four second broods, one had 2 young, two had 3, and one had 5. One brood of 2 might have been first or second. In the case of the second brood of the Temple pair one dead young bird was found in the nest. A second clutch of four addled eggs was found at Birmingham. *The Handbook* gives 4-6 eggs for the clutch.

Nest Site.

The following information is available about the actual sites of nests :

Birmingham: very conspicuous site above main entrance to University; same nest used for second clutch.

London: at Charterhouse in the socket of a beam in a ruined building 30 ft. from the ground; at the Temple under a fireplace on the first floor of a bombed building; same site (and presumably same nest) used for second clutch.

Lowestoft: Pair A nested on a beam in a cartshed at a dis-used boatowner's store, and did not use the same site for its second clutch; Pair B nested in an old fish-trunk nailed to a post inside an open-fronted store, and also used a different site for its second brood; Pair C nested on top of a brick buttress in an abandoned factory 25 ft. from the ground, and built its second nest on top of another buttress at the other end of the same workshop.

St. Leonards: in a shallow hole in the remains of a brick cellar wall, 6-7 ft. below the ground level and 5 ft. above the floor level.

Thus all except the Birmingham pair and Pair B at Lowestoft depended on bomb damage for their nesting-sites. Two pairs used the same nest a second time, and three pairs did not. The nest sites seem not to differ in any important particular from those given in *The Handbook*, viz. "in any kind of hole or ledge in buildings."

Food.

The principal food recorded being taken to the young was grubs or larvae of various kinds (P.A.A., C.E.L., M.P., C.H.W.), but this was probably because smaller food would not be distinguishable. O.H. saw the Temple birds catching insects on the wing, and M.P. saw whitish moths being taken to this brood. At St. Leonards the female was seen carrying bunches of flies and the male a small earthworm (N.F.T.).

Nest Sanitation.

The hen of the Charterhouse pair was seen to wait, after bringing food to the nest, for the young to deposit a faecal sac at the edge of the nest, and then seized it and flew off with it (C.H.W.). At St. Leonards the cock was seen to carry away and drop a faecal sac (N.F.T.).

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NOTES.

PINE-BUNTING IN ORKNEY.

ON October 15th, 1943, I had a close view of a male Pine-Bunting (*Emberiza leucocephala*) on Papa Westray, Orkney. I watched it from a window from a range of about 12 feet, feeding amongst some rather long grass.

The crown and nape appeared a slightly dirty white or what I might better describe as white with a few grey feathers in it. Round the white except at the nape ran a distinct black band, pretty broad in front from the base of the bill to the start of the white crown. Under this black band was a russet patch stretching from the bill under the eye to the black fringing the crown. Under this was another streak of greyish white, which it struck me might be best described as shaped somewhat like a Gurkha's kukri with the handle forward. Below this was a triangular russet patch on the chin, extending from the base of the beak to the upper throat, with a few blackish feathers at the sides of the neck, and below this a white bib with a few greyish streaks at the base. A narrow band of chestnut feathers stretched across the breast. The rest of the breast and belly were white merging at the sides into chestnut streaked with white. The mantle and scapulars merged from the greyish white on crown and nape into chestnut streaked with black, and the rump was light chestnut. The primaries were distinctly white-edged and the lesser wing-coverts gave one the impression of being dark nearer the back, merging into very light at the side.

The bird was very tame and I watched it for half an hour without going outside. When I made it fly the white under-belly showed distinctly. The axillaries showed up darkish grey surrounded by white and the under-wing was greyish white shading into chestnut and dark brown on the under wing-coverts. I followed the bird, which settled not far away, and paid attention to the beak colour and legs. The upper mandible was dark greyish brown, shading into palish brown on the lower mandible. The legs were roughly the same colour, but yellowish tinged. It appeared to be feeding on grass seeds.

A south-easterly gale had been blowing for three days.

G. T. ARTHUR.

[Mr. Arthur's very careful and complete description leave no doubt of the correct identification of this very rare vagrant, of which this is the second record for the British Isles. The single previous recorded occurrence is that of a male shot at Fair Isle on October 30th, 1911 (W. Eagle Clarke, *Scottish Naturalist*, 1912, p. 8). —EDS.]

WAXWINGS IN GREAT BRITAIN.

WE have received a number of reports of Waxwings (*Bombus garrulus*), chiefly in Yorkshire. The following records have been received to date :—

OXFORDSHIRE.—Two at Lower Heyford, January 10th, 1944 (J. S. Watson).



WAXWINGS.

Ipswich, January 8th, 1944.

(Photographed by S. C. Porter)

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SUFFOLK.—Lance-Corpl. S. Cottier writes that he saw a flock of thirty or more at Yoxford, near Saxmundham, Suffolk, on December 7th, 1943. They were feeding greedily on berries and were very noisy, emitting a redpoll-like trill almost continuously. Mr. S. C. Porter and Mr. S. Beaufoy watched a flock of 30-40 on the outskirts of Ipswich on January 8th, 1944 (see photograph), and Mr. R. A. Humphries writes under date January 9th, 1944, that some 20-30 have been present at Farnham Park, Bury St. Edmunds. Also five seen on the outskirts of Ipswich on January 18th by Mrs. D. Wightman.

LEICESTERSHIRE.—One in a garden at Rothley, January 1st, 1944. Ten there, January 9th, evidently part of flock (of fourteen) seen subsequently on same day at Swithland Reservoir and again on January 11th. Flock of 40-60 in same district on January 15th, 20-30 on January 23rd and 12-15 in another locality, and nine on January 29th (A. E. Jolley).

YORKSHIRE.—Mr. Ralph Chislett has kindly placed at our disposal the report which he has prepared on Yorkshire, from which the following particulars are mainly extracted:—

First record, a single bird at Partridge Hill, Goathland, November 11th (W. S. Medicott). One in the Vale of Pickering, November 18th (R. M. Garnett). Three at Levisham, November 19th (R. Green). About twelve on Pexton Moor, November 24th (F. Hunton).

The numbers noted then began to increase. On November 26th about seventy were observed in Middlesborough Cemetery and many remained in the neighbourhood; some still present, January 25th (O. C. Hill). On December 1st a flock in Peasholm Glen, Scarborough, was estimated by G. B. Horsman at about two hundred birds. They remained about a week and were watched by R. M. Garnett on December 6th, feeding on haws and on insects taken on the wing.

Capt. J. P. Utley reported thirty-four near Catterick on December 4th, the number rising to about a hundred on December 6th. These were also feeding on haws and one party apparently catching insects. Birds were still present in late December, and Cadet J. M. B. King reports some still about in January, including six on January 9th.

Sixteen were seen on December 15th by T. N. Roberts at Spring Hill, Scarborough, where "scores" were reported on the 18th. On the 18th a new flock of about a hundred appeared in Peasholm Glen (W. J. Clarke), and during the same week several were seen in Harley Street, Scarborough, by L. H. Thompson. About a hundred on December 18th at Shepherd's Hill Farm, near Pickering, were reported to have been present about a fortnight, numbers subsequently diminishing as haws were consumed, but four still present, December 24th (R. M. Garnett).

Also about two dozen in Valley Gardens, Saltburn, December 21st (D. M. G. Wishart); reported in local paper to have been at Saltburn about a month. Five in Savile Park, Halifax, December 22nd (G. R. Edwards). A dozen in lower Wensleydale, December 22nd (J. P. Utley). One at Skidby (E. Riding) during Christmas (C. Fox). Four near Burley-in-Wharfedale, January 1st, 1944 (W. F. Fearnley).

Capt. Medicott, Mr. Wishart, Capt. Utley and Cadet King have reported their observations to us direct.

The insect food being taken by the Scarborough birds above the tree-tops appeared to be a Staphylinid beetle, identified by Mr. H. Britten, to whom Mr. Garnett sent specimens, as *Omalium rivulare* Payle.

ORKNEY.—Five or six at Kirkwall; first seen, November 11th. Another party, December 15th (G. T. Arthur).

STOAT KILLING NESTLING PIED FLYCATCHERS.

DURING June, 1943 two cases were noted where low-nesting Pied Flycatchers (*Muscicapa h. hypoleuca*) came to grief through the activities of ground-vermin. One pair nested four feet from the ground in the decayed trunk of a wild service-tree: the loud and sustained alarm-notes of the adults drew my attention to a Stoat running excitedly about the decayed trunk and presently the animal appeared with what proved to be the last nestling in its mouth. The remains of the other nestlings—the entrails and legs and toes—were found on the tree-trunk close to the nest-site. The other pair nested six feet from the ground in the decayed trunk of an alder: when first found the nest held two eggs. On the next visit the disarranged nest-lining and broken eggs strongly suggested that the sitting bird had been surprised by a Stoat or Weasel, especially as the two nesting-sites were in the same wooded area and no more than four hundred yards apart. R. H. BROWN.

FIRECREST IN WARWICKSHIRE.

I WISH to record the fact that on December 13th, 1943, an exhausted Firecrest (*Regulus i. ignicapillus*) fell into my pony trap. It was taken into the house, warmed, identified, and revived. From the whiteness of the superciliary line, I thought it to be a male bird. Next morning it was released.

A fortnight later, a dead Firecrest was found in a shrubbery a quarter of a mile from the house. Its identity has been confirmed, through the kindness of the Secretary of the Royal Society for the Protection of Birds, by the British Museum.

I wish to place this on record as, according to *The Handbook of British Birds*, a Firecrest has never before been recorded in Warwickshire. G. G. ALDERSON.

EARLY DRUMMING OF LESSER SPOTTED WOODPECKER.

IN *The Handbook of British Birds*, the drumming period of the Lesser Spotted Woodpecker (*Dryobates minor comminutus*) is shown in H. G. Alexander's chart as beginning at the end of January. It may be of interest to record that on December 27th, 1943, I heard and saw a male of this species give several drumming performances. It was a relatively slow variation, as well as I could estimate of 6-8 blows per second and of 1-2 seconds' duration. It was also somewhat subdued, with a carry of 60-70 yards. The weather was very mild and sunny—maximum day temperature 53°F., which may have been contributory to these performances.

P. J. ASKEY.

[Occasional autumn and early winter drumming has been noted by others. The Rev. E. Peake, for example (*antea*, Vol. xx, p. 69), refers to it as sometimes noticed in September, October and November, "the latter being the most likely of the three."—EDS.]

BARNACLE-GEESE IN DERBYSHIRE.

IN connexion with the report in the March *British Birds* (*antea*, Vol. xxxvi, p. 204) of a Barnacle-Goose (*Branta leucopsis*) inland in Cheshire, it may be of interest to quote from my diary, under date October 20th, 1940, and with reference to Glossop, Derbyshire, a record of "the passage of twenty-five Barnacle Geese from north-west to south-east, flying about one hundred and fifty feet up against a strong wind, which continually forced them to break formation Several of them uttered sharp, rather high-pitched notes. Their black necks and breasts showed clearly against the blue sky, as did their white under-parts, dark grey wings and large white face patches."

I would add that these birds must have passed over the nearby Longendale reservoirs in Cheshire, although I doubt if they had rested there.

I am acquainted with the larger and differently patterned Canada Goose (*Branta canadensis*) and there was no confusion with that species in the present instance, as I was able to obtain an excellent view, in bright sunshine, through field-glasses.

CHRISTOPHER M. SWAINE.

DIVING OF CANADA GEESE.

I WAS interested to read the description by Mr. J. A. G. Barnes (*antea*, p. 158), of Grey Lag-Geese plunging and somersaulting, etc. on the Kent Estuary, Westmorland.

In February 1942, I watched a flock of some 20-30 Canada Geese (*Branta c. canadensis*) on the stretch of the Thames between Pangbourne and Goring doing the same thing. I believe these Geese have been here for many years having originally been introduced privately. They never leave this part of the river and could be classed as tame.

I watched this flock swimming all together down stream, diving, dipping, turning complete somersaults and kicking their legs when inverted and turning the water up into quite a heavy sea! It was most entertaining and although most likely it is quite a common occurrence it was the only time I have seen such a display.

A. R. LUCAS.

UNUSUAL NESTING-SITE OF WOOD-PIGEON.

ON June 12th, 1943 a Wood-Pigeon (*Columba p. palumbus*) was flushed from a nest of two eggs built inside a bucket that was suspended from a beam inside a cattle-shed near Rose Castle, Dalston, Cumberland. The nest of twigs filled approximately one-half the bucket. Within fifty yards of the cattle-shed is a small mixed plantation of trees, whilst a row of mature Wellingtonias grows near the shed.

R. H. BROWN.

MAGPIES AND ROOKS PERCHING ON BACKS OF ANIMALS.—In connexion with the observation on Magpies recorded by Mr. J. C. S. Ellis (*antea*, p. 159), several correspondents have written to us

recording similar experiences, which seem to show that, at any rate where Magpies (*Pica p. pica*) are common, the habit is not very unusual. Mr. A. J. Harthan has observed it on several occasions in the Evesham district and also in Somerset and Cheshire, and Mr. L. P. Samuels writes that he noticed it repeatedly in Normandy, where Magpies are numerous, in August, 1932. He also observed a single case at Mobberley, Cheshire, in October, 1942, as did Mr. F. A. H. Low near Barlaston, Staffs., on October 13th, 1942, and Flt.-Lt. E. Cohen at Hawarden, Flintshire, in the late autumn of 1943. Mrs. M. Darge saw two out of a party of six perching on sheep in the Sedlescombe district, Sussex, on January 6th, 1944, and Capt. J. B. Tyrer observed two or three birds so engaged on two occasions at Clandon, Surrey, in October 1943. Mr. H. Tully also saw two on the backs of sheep at Matfen, Northumberland, on January 15th, 1938. One was observed going from one sheep to another and systematically picking something off them. In addition, Mr. D. F. McKinney saw two perched on a cow's back in Co. Antrim, Northern Ireland, in December, 1943.

A similar habit may be observed occasionally in the case of Rooks (*Corvus f. frugilegus*), as we are reminded by Mr. A. D. O. Elliott, who has seen it several times.

MARSH-TITS ATTACKING CYPRESS CONES.—*Correction.*—The observation referred to (*antea*, p. 180) was made at Kegworth, Leicestershire and not at Sutton Bonnington.

EARLY SUMMER PASSAGE OF TERNS.—With reference to the notes under this heading (*antea*, p. 137), Mr. W. Griffiths writes that his experience at West Kirby, Cheshire, for the past twelve years confirms that of Major A. W. Boyd at Hoylake. Common and Arctic Terns (*Sterna h. hirundo* and *Sterna macrura*) appear on the shore there in July and passage continues through August, finishing in September, with occasional odd birds in early October.

LETTER.

BLACK-HEADED GULLS NESTING IN SHROPSHIRE.

To the Editors of BRITISH BIRDS.

SIRS,—With reference to the note under the above heading (*antea*, p. 100), may I point out: (1) that the site of this gullery is not in Shropshire but just outside the county boundary and in Herefordshire; (2) that it was first recorded in the Caradoc and Severn Valley Field Club's *Record of Facts* for 1934, when Mr. W. D. Smith reported "several" nests; and (3) that it was also recorded in the survey of Black-headed Gull colonies (*antea*, Vol. xxxiii, p. 202) as at Brampton Bryan and quite properly placed under the heading of Herefordshire. As stated in the Survey, it was probably established about 1933. The actual first record of these gulls breeding in Shropshire appears to be that of Mr. W. F. Ireland (*antea*, p. 139).

L. C. LLOYD.

[We are much obliged to Mr. Lloyd for correcting this point, but as the information originally reached us there was nothing to show the identity of the site with Brampton Bryan.—EDS.]

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NOTES ON A PAIR OF MOORHENS

BY

R. H. BROWN.

THESE notes were obtained intermittently during the three years 1941 to 1943 on a pair of Moorhens (*Gallinula ch. chloropus*) that frequented a small roadside pond in Cumberland. The pond has an area of 20 yards \times 17 yards: open to view from the road, the other two sides bordered by overhanging willows and hawthorns under which the Moorhens can take refuge. Thirty-one young were reared during these three years, but it is not known whether the breeding pair was always the same two individuals.

The following table briefly summarizes the data obtained :—

Year	Nest-Building Began	Nest Finished	First Egg	Last Egg	Clutch	Hatched	Incubation Period	No. of Young Hatched	No. of Young Reared
1941.	March 19	March 23	March 30	April 6	8 eggs	(April 8) Robbed	DAYS —	—	—
"	April 14	April 15	April 17	April 25	9 "	May 13-14	18-19	9	6
"	—	—	June 3	June 8	6 "	June 28	20	6	4
1942.	March 18	March 21	March 30	April 6	8 "	April 25-26	19-20	8	6
"	—	—	May 29	June 2	5 "	June 21-22	19-20	5	4
"	—	—	July 13	July 14	2 "	August 3	20	2	2
1943.	March 2	March 6	March 21	March 27	7 "	April 16-17	20-21	6	4
"	May 20	May 21	May 21	May 27	7 "	June 16-17	20-21	7	5

Both adults took part in nest-building: in 1941 and 1942 no nest building operations were noticed before the third week of March, but in 1943, doubtless owing to the milder weather conditions prevailing as compared with the two previous seasons, building operations began during the first week of March.

The new nest of the year was always built on the remnants of last year's: both birds would swim in company across the pond to last year's nest: one would climb on to the remnants, displaying its white under tail-coverts and pecking vigorously with its bill at the nest remains, whilst the other adult would swim around the nest, also displaying its white under tail-coverts. Then the second adult would climb on the nest and perform as the first, whilst its mate swam around the nest. Or both birds would stand side by side on the nest, pecking vigorously at it, sometimes calling, and invariably displaying, fan-like, their white under tail-coverts. Then, whilst one adult remained on the nest remnants, pecking vigorously, the other would swim away for nesting material and, returning, hand it to its mate. In the early spring the new nest took four or five days to build, but later in the season if the birds were in a hurry, a nest was built in one or two days, and this nest was not built on the remnants of a previous one. Nesting material was added throughout the incubation period: the non-sitting bird would swim across the pond with nesting material in its bill and hand it to the sitting bird, who placed it on the nest.

In each year the hen brooded on the empty nest three or four hours a day between the completion of the nest and the laying of the first egg. In 1941 she brooded for six days before laying the first egg; in 1942 for eight days; whilst in 1943 she brooded for fourteen days. During the laying-period she brooded the eggs for several hours each day, and as far as could be ascertained incubation proper did not begin until the last egg was laid. The incubation periods in the above table are based on this assumption.

On March 22nd, 1943, coition took place by the edge of the pond; then the hen swam to the nest with a piece of nest material and placed it on the nest. On May 22nd, 1943, coition occurred in a neighbouring grassfield, accompanied by a certain amount of wing-flapping by the cock, but otherwise without any untoward incident.

On the afternoon of April 14th, 1943, the non-sitting adult was noticed to swim towards the nest, where the other adult was brooding on seven eggs; as it approached the nest it bobbed vigorously with its head, then, the nest reached, it preened its neck-feathers with its bill. The sitting adult did likewise, first bobbing its head, then preening its neck-feathers; afterwards it left the nest and its mate took over the incubation.

On April 4th, 1942, the hen, when disturbed from six eggs, placed several oak leaves over them before leaving the nest.

In 1941 the first brood hatched out during May 13th-14th and were brooded almost continuously in the nest by the hen(?) until the 22nd, a period of eight to nine days, before they were allowed on the water for any considerable period. Occasionally a single nestling would leave the nest and swim about with the cock(?) for a short period, but it soon returned and in general the young were not on the water before the 22nd. In 1943 the first brood hatched out during April 16th-17th, and these were brooded continuously during the day until April 27th, a period of ten to eleven days, before they were allowed on the water.

At midday on April 25th, 1942, three nestlings were hatched out: when disturbed these scuttled into the water, whereupon the hen(?) at once left the nest and swam after them and the cock(?) swam across the pond and climbed the nest to brood the other hatching eggs.

After the young had spent about a week on the water they were then led by the adults into the neighbouring grassfield where the bulk of their food appeared to be obtained. In May 1941 the cock(?) was noticed pulling out the roots of a water-plant by the pond edge and feeding it to a single nestling. Otherwise when the two broods were hatched it was a common sight to see both broods, in various stages of plumage, feeding in the neighbouring grassfields with the two adults.

In 1942 the second brood hatched out during June 21st-22nd, and on June 24th a young bird of the first brood was seen to feed one of these downy nestlings with some small insects that it caught

on the surface of the pond. On several occasions after this date a first-brood juvenile was seen to feed one of the second brood downy nestlings with insect food, and when the third brood of two nestlings hatched out on August 3rd a first brood juvenile was seen to feed these third brood nestlings as well.

In 1943 the second brood hatched out during June 16th-17th, and from June 28th onwards a first-brood juvenile was frequently noticed to feed two nestlings of the second brood with insect food.

At dusk on July 20th, 1943, the young of both the first and second brood were found roosting in the nest in which the first brood was hatched.

On August 9th, 1941, an adult was noticed carrying nest material to the second nest, but nothing came of this nest building.

In 1941 the two broods of young, ten in all, stayed on the pond until the third week of August; between then and October 13th the young quietly slipped away until on that date only four young were left with the adults. These four stayed until January 15th, 1942, when the pond was frozen over and all six birds left it and frequented a small swift-running stream about three hundred yards distant from the pond. When the pond thawed on January 26th, four birds returned to it and stayed until the second week of March, when the two juveniles disappeared one day, leaving the two adults in possession of the pond.

In 1942 the young of the three broods, twelve birds in all, were still about the pond on September 9th; by November 5th only six young were left with the adults. On November 15th a third adult suddenly appeared on the pond, and for the next two days, until this adult was chased away, the three adults were continuously chasing one another across the pond, flirting their white under tail-coverts, and pecking with their bills at the water; the whole performance usually accompanied with a good deal of calling. On the third day this interloping adult was chased from the pond and comparative quiet reigned once more. In general little display was seen from these two adults during the winter months; an occasional chase across the pond, with flirting of the white under tail-coverts, and a little calling was the most that was noticed. From March onwards the two adults were more ostentatious in their display, swimming about and calling more, but even at this season the display could only be described as a quiet one.

There were still six young about the pond on December 3rd, 1942, but by December 30th there were only two young; they remained until February 24th, 1943, when they disappeared and the two adults were once more in sole possession of the pond.

In 1943 the nine young were still about the pond on August 31st; by September 19th only the five young of the second brood were left and these were reduced to three young by November 14th.

PUBLICATION OF THE BRITISH TRUST
FOR ORNITHOLOGY

THE INDEX OF HERON POPULATION, 1943

BY

W. B. ALEXANDER.

THE number of reports on sites occupied by Herons in 1943, which were received at the Edward Grey Institute, was 104. Of these 75 were in England, 3 in Wales, 6 in Scotland and 20 in Ireland. We are indebted to 54 informants, of whom a considerable number have collected information from friends and correspondents. The Rev. P. G. Kennedy sent reports on 15 heronries in 7 counties in Eire, Major A. W. Boyd on all the 8 known heronries in Cheshire and South Lancashire and Mr. J. G. Harrison on the 4 known heronries in Cambridgeshire.

In 77 heronries counted in 1942 and again in 1943 there were 1,209 nests in the former year and 1,354 in the latter, an increase of about 12 per cent.

Of the heronries counted in 1943 only 60 were included in the census of 1928, when they contained 1,512 nests. In 1943 they contained 1,239 nests or 82 per cent. In 1942 the index based on 1928 was 72, so that an increase of about 14 per cent. is indicated.

For 90 of the heronries counted in 1943 we have figures for one or more years when the population was normal (1928, 1936, 1937, 1938 and 1939). The average total population of these 90 heronries in normal years was 2,026 whilst in 1943 it was 1,665. This gives an index of 82 as compared with 68 in the previous year, an increase of about 21 per cent.

The percentage for individual regions (omitting those for which the data are inadequate) are as follows :—

		1942	1943	Change
South-west England	...	55	71	+ 16
Thames Drainage Area	...	79	80	+ 1
Eastern England	... ..	44	52	+ 8
Midlands	... ..	74	95	+ 21
North-west England	...	68	77	+ 9
Ireland	... ..	71	103	+ 32
<hr/>				
England and Wales...	...	68	79	+ 11
British Isles	... ..	68	82	+ 14

It will be seen that an increase has apparently occurred in all parts of the British Isles, but seems to have been most marked in Ireland, the Midlands and South-west England. Severe gales which occurred in April blew down nests in many heronries, so it is possible that the increase in the number of breeding pairs was actually greater than the figures show. In most cases however, our informants seem to have counted the nests before the gales occurred and have been able

to state the number of nests destroyed and to include them in the total. Reports of late nests from a number of heronries, mostly described as second broods, may have been due to the fact that pairs which lost their broods in April nested again.

The winter of 1942-3 was the mildest experienced for 30 years. It seems natural therefore to attribute the increase in the breeding population of herons to the mildness of the preceding winter, just as the great decrease in 1940 was attributed to the severity of the early months of that year. But if it is true, as has been stated, that herons do not breed till their second year, it would seem that the increase of the breeding population implies an increased survival of young birds in the winter 1941-2. As recorded in our previous report this was a severe winter and the breeding population in the succeeding spring was found to have fallen by about 5 per cent. It seems unlikely therefore that an unusual number of young birds survived. If increases in the breeding population come from birds which have survived two winters there should be a very considerable increase in 1944 as the result of two successive exceptionally mild winters. We propose therefore to wait for the 1944 figures before discussing this question further.

In previous reports we have several times referred to the gradual shifting of heronries from one site to another. Figures supplied by Messrs. J. Wickens and J. Ashbee now enable us to show what has happened in the case of the well-known heronry at Aldershaw, Beckley, Sussex. The majority of the birds appear to have settled near Rye, whilst some have gone to Winchelsea. In the year 1939, when the great decline at Beckley began, small groups or individual pairs nested at certain other sites in the vicinity where they lacked protection and apparently did not remain. The main movement is shown in the following table :—

			1938	1939	1942	1943
Beckley	...	...	121	61	10	4
Winchelsea	...		3	2	4	10
Rye	...	...	3	13	33	50

The two areas in which the nests in all the known heronries were counted in 1943 confirm the increases revealed by the general sample. In Cheshire and South Lancashire 189 nests in 8 heronries were reported in 1943 as against 176 in 7 heronries in 1942 and 173 in 8 heronries in 1928. In Cambridgeshire there were in 1943 48 nests in 4 heronries as against 29 in the same 4 heronries in the previous year.

In conclusion we must again express our thanks to all those helpers who have supplied the information on which this report is based. As pointed out above the figures for 1944 will be of special interest, and particulars of the number of nests occupied in any heronry (if possible between April 15th and May 10th) will be gratefully received by the writer at the Edward Grey Institute, 39 Museum Road, Oxford.

NEST-CONSTRUCTION BY BIRDS

BY

LT.-COLONEL B. H. RYVES.

(*Concluded from page 188*).

CERTAIN MATERIALS AND THEIR USAGES.

There are two sorts of material that fulfil so important a purpose in the nests of certain species that they demand consideration here. I refer to mud and spider-silk :—

Mud is used by most of the Corvidæ and Turdidæ for the consolidation of their nests, by the Nuthatch to reduce the size of the entrance hole, by the Dipper to stiffen the “doorstep,” by the Kittiwake as a foundation and by the Hirundinidæ as the main structure of their nests.

In regard to consolidation by birds that build stick nests, I think the Raven and Magpie have reached the highest degree of efficiency. It takes a severe gale indeed to dislodge the nest of either.

Of the four species of Turdidæ which breed in Great Britain, I believe that the Mistle-Thrush and Blackbird afford the best examples of mud-craft. The nests of both are solidified to a surprising extent, and when the mudding has fully dried it sets so hard that it is difficult to break them in two by hand without an effort. The Song-Thrush, however, only provides a thin lining of mud and, in my experience, the nest is more loosely constructed and is more susceptible to the ravages of wind.

The Kittiwake reverses the use made of mud by the birds described above. It constructs and treads down a foundation of mud mixed with weeds on which the nest proper is “gummed” so to speak—a work of great skill.

Spider-silk (or cocoon-silk), often found in walls and tree-trunks, are used by Long-tailed Tit, Chaffinch, Goldcrest and Spotted Flycatcher. I know of no others.

Surely the Long-tailed Tits' nest is a masterpiece of felting in exquisite perfection, and Chaffinch and Goldcrest are close rivals for the honours in felting. Could such perfection be achieved without the interweaving of materials and spider-silk? I scarcely think so. But why does the Spotted Flycatcher use cobwebs in its slight and often loosely built nest? Why does not the Goldfinch use them in its small, neat and well-built nest?

However, I am not sure that the vegetable-down used by the latter may not possibly be an ingenious substitute for spider-silk. Besides the use of this material as lining I have found bits woven with other material into the foundations of a nest and forming a sort of twisted rope.

One wonders whether other species, in the course of evolution, may acquire the art of felting and more species develop the capacity of consolidation with mud mixed with some secretion of the bird.

Both silk and mud appear to be key materials for the purposes for which they are used by comparatively few birds. From this the inference may be drawn that some species have advanced much further than others in nest-craft.

THE ESSENTIAL FEATURES OF A NEST.

The necessary features of a nest, to a greater or less degree according to site and other conditions, seem to fall under four heads :—

- (1) Stability ; (2) Suitability for the eggs and incubating bird ; (3) Suitability for the young ; (4) Concealment.

I shall discuss these points seriatim :—

(1) *Stability.*

The successful rearing of broods by birds which breed in trees, bushes or cliff-ledges is largely dependent on their nests being securely fixed and capable of resisting winds.

Some birds are more successful than others in effecting stability. I have already stated the importance of consolidation by mud and of compactness by the admixture of spider-silk. Not all birds which construct stick-nests have acquired mud-craft. The Buzzard for example, has not, but it makes quite a good job of its nest in a tree, which is usually constructed in a stout fork from which branches emanate. The nest is a great deal shallower than that of the Raven and thus presents a lesser target to wind. A wide, untidy platform is formed by a mass of large sticks which are wedged among the branches and a flattish cup sunk in the middle. On the ledge of a cliff, however, this hawk builds quite a slight structure, merely consisting of a lined cup with a rampart of a few sticks on the outside edge. The bird seems to be defeated by the lack of supports into which to wedge the sticks. I suggest that the purpose of the rampart is to prevent the chicks falling out when they wriggle backwards to defecate clear of the nest. Some years ago I watched a cliff-nest which lacked the rampart and a chick did, in fact, go overboard in this way.

Two final examples of a comparative nature must suffice. The Goldfinch's nest has already been described, so I need only add that it is very securely fixed and will withstand a gale unimpaired, though eggs may be tossed out of it. The Greenfinch's nest, on the other hand, is bulky and loosely put together. Sometimes it seems to be just dumped into position with but little attempt to anchor it. I have found untimely gales take toll of nests built in trees or unsheltered bushes.

(2) *Suitability for the eggs and incubating bird.*

It is obvious, I think, that a nest holding eggs under incubation must have no surplus space within the cup. The sitting bird must fill it comfortably with its flanks touching the inner wall. I have already tried to show that the inner dimensions of the cup are automatically adjusted by the gyrations of the builder.

(3) *Suitability for the young.*

It is a simple truth that a nest which holds eggs without any redundant space is not going to accommodate with ease the chicks which emerge and progressively grow. How do birds, other than those whose chicks abandon the nest when a few hours old, provide for the extra space their young will need?

Though the foundations are firmly fixed, most nests are not rigid structures. The rims and walls are rendered flexible so as to yield to outward expansion through the gradual pressure brought to bear on them by the developing young. In the case of large broods a nest often becomes almost a flattened platform by the time the young are "fledged." One sees this condition with such birds as Goldfinch, Robin and other small Passerines. Even a Raven's massive nest is flexible in its upper parts, and I have witnessed several nests virtually reduced to platforms before the broods were ready to leave it.

Though the broad principle of the provision for extra space seems to be flexibility, this is not invariable. For instance, young Buzzards secure the extra room they need by spreading themselves over the wide platform of sticks which extend beyond the comparatively small cup.

With the Song-Thrush the question of space is puzzling. The mud lining almost reaches the rim of the nest and as it sets hard there can be but little flexibility. I can only think that the unusual depth of the cup and its widening towards the top provide the extra room that was superfluous for the eggs when they lay snugly on the narrower bottom.

(4) *Concealment.*

The sites favoured by different birds bear considerably on this point. Most birds dislike being seen from above, whence danger is most to be expected, so they concern themselves mainly with hiding their nests from any predatory bird that might fly overhead or perch in a nearby tree. In this connexion it is odd that they do not worry about the materials they have carelessly left outside, which may lay a trail to their whereabouts.

Colonial birds make no attempt at concealment. They rely on their numbers for the protection of their belongings and some of them, in addition, on the camouflage of their eggs and young.

Some Buzzards conceal their nests tolerably well in ivy-clad trees and pines, but many construct conspicuous nests in deciduous trees. I cannot believe that the greenery they place on them is for decoration. Surely it is for the purpose of harmonization with their surroundings.

Finally, may it not be the primary impulse or instinct of concealment that impels tits, woodpeckers, kingfishers and other birds to place their nests in holes or tunnels, certain warblers, Long-tailed tit and Wren to provide a roof over their nests and the Goldcrest to suspend its lovely structure on the under part of a branch?

OBITUARIES.

HERBERT EDWARD FORREST (1858-1942)

MR. HERBERT EDWARD FORREST, F.L.S., who died at his home at Bayston Hill, near Shrewsbury, on November 6th, 1942, after only a few days' illness, did notable work as both naturalist and antiquary. Born at Wolverhampton, he was educated at Shrewsbury School, and after a few years in Lloyds Bank came to Shrewsbury to take charge of the music and pianoforte business established by his father.

Mr. Forrest began as a student of pond-life, but afterwards became interested in the vertebrates. His *Vertebrate Fauna of Shropshire* was published in 1899, and his most important work, *The Vertebrate Fauna of North Wales*, came out in 1907. It was supplemented in 1919 by a *Handbook to the Vertebrate Fauna of North Wales*. In the *Victoria County History of Shropshire* (1908) all the articles on vertebrate zoology are from his pen. He contributed numerous papers and notes to the *Zoologist*, the *Naturalist*, *British Birds*, the *North-Western Naturalist*, and other journals. Perhaps his most notable ornithological paper was "The Movements of Starlings" (*Zoologist*, 1900).

Although he was a zealous and competent observer—as many of his published notes bear witness—Mr. Forrest's main services to ornithology—and to natural history generally—lay in the collection and correlation of the observations of others. This is work which demands considerable acumen, discrimination and judgment, and he proved that he possessed these qualities in ample measure. For almost fifty years he was the main leader and inspirer of the Caradoc and Severn Valley Field Club, which he served first as secretary and latterly as president. During the whole period he edited the annual *Record of Bare Facts*, which contains a valuable body of material relating to the natural history of Shropshire and North Wales.

This is not the place to speak of Mr. Forrest's work as an antiquary (important and extensive as it was), but reference may be made to the task which absorbed most of his energies during the latter years of his life, the promulgation and advocacy of his theory of the origin of the Ice Age, set forth in *The Atlantean Continent* (Witherby, 1933; revised edition, 1935).

Vigorous in mind and body Mr. Forrest retained to the last the zest and energy of a man half his age. His breadth of interests, his almost boyish enthusiasm, his quickness of perception and resilience of mind, made him a delightful companion, whether in the field or in the study. And, like all good naturalists, he was ever ready to put his knowledge and experience at the disposal of other workers. By his passing Shropshire has lost a distinguished student of nature, and a wide circle of friends and fellow-workers have lost a notable personality from their midst.

L. C. LLOYD.

HAROLD JOSEPH MOON (1875-1943).

DR. HAROLD J. MOON, who died suddenly at his home at Patterdale, Westmorland, on October 29th, 1943, will be chiefly remembered as an ornithologist for his amazing energy and success in ringing.

He took his medical degree at Owens College, Manchester, and before settling down to practice in Manchester went as ship's surgeon on a voyage to the South Sea Islands. After some years in Manchester he transferred to St. Annes, but volunteered early in the war of 1914-18 and saw active service in France, where he sustained an injury to the left arm which proved a lifelong handicap. A breakdown in health about 1922 led to his retirement to Patterdale, where, as health returned, he devoted himself to field ornithology. At the outbreak of the present war he offered his services and was given the important post of President of the Medical Board of the Carlisle Recruiting Centre, where his arduous and much appreciated services contributed to his early decease.

His great personal charm and tact combined with a strong sense of public service, made him prominent in many Lake District activities. He was also a popular and successful lecturer and broadcaster on ornithological and natural history subjects. He leaves a wife, a son and a daughter, to whom we extend our sympathy.

Dr. Moon joined the *British Birds* Marking Scheme in 1912, and in the twenty-eight seasons up to 1939 he built up the amazing total of about 78,000 birds, averaging nearly 2,800 annually. His record total for any one year was 5,569 achieved in 1939, and previously he had four times exceeded the 5,000 mark. When it is said that he never ringed among birds nesting in colonies these figures are all the more extraordinary. He had the assistance of two most competent helpers, Mr. Sherwood in the early days and in more recent years Mr. J. Cooper, whose gift for locating nests and running young was remarkable.

The recoveries from the quantity of birds which Moon ringed were numerous and interesting, and to quote only one or two of outstanding importance, reference must be made to the Lapwing which crossed the Atlantic to Newfoundland as part of a flock found there in December, 1927 (*antea*, Vol. xxi, p. 215), to another Lapwing reported from North Italy in 1929, the only record showing a south-easterly direction taken by this species (Vol. xxii, p. 375) and a Curlew shot in the north of Spain in 1937, which is the only instance known of a British-bred Curlew migrating overseas, other than to Ireland (Vol. xxxii, p. 111).

R. H. BLAIR, F. P. LEACH.

NOTES.

TWO-BARRED CROSSBILL IN NOTTINGHAMSHIRE.

SINCE the Two-barred Crossbill (*Loxia leucoptera bifasciata*) has not been recorded from this county for a considerable time (I can find only one old record, *cf.* J. Whitaker, *Zoologist*, 1902, p. 353), this report may be of interest.

On December 22nd, 1943, while at Wollaton Park, Nottingham, I had an excellent view for about ten minutes of a male of this species whilst it was perched in an oak. The colour of the bird was a bright pink. The wing-bars were seen quite distinctly both when the bird was at rest, when they showed as two fairly broad white patches, and while it flew among the tree tops. No call was heard owing to the noise of other birds in the vicinity. The woods and vicinity are rich in larch and conifer trees. R. J. RAINES.

MIGRATION OF CHAFFINCHES AND OTHER BIRDS ON THE SOUTH-WEST COAST.

WITH reference to the notes on "Chaffinch Migration on the South West Coast," by D. A. Bannerman (*antea*, p. 177), this migration was also noted near Ilfracombe. The following notes are from the records I made of this movement.

The first sign of migration was noted at 7.30 a.m. on Wednesday, October 20th, 1943, when small parties of 20-40 passerine birds were observed. They moved in quite distinct flocks, fairly well packed together, at intervals of not more than 30 seconds. The flight was steady but "jerky" at a height not exceeding 200 feet, and as far as I could observe they kept closely to the coast line. Standing on Hillsborough, Ilfracombe, which is 430 feet high, the flocks passed well below me, when several flocks could be seen at once. It was a lovely clear morning, no wind and the sun shining. Owing to my duties, I was unable to observe the movement throughout the morning; it was still in progress at 1 p.m., but I saw no further movement at 6 p.m., when I was again able to make observations.

The same morning movement was again in progress on Thursday, October 21st, and Friday, October 22nd, 1943, but the flocks had increased from about thirty to two hundred birds. The weather was still clear, but the wind was fairly strong from the south-west. I saw no further movement of this migration after 1 p.m. on Friday, October 22nd.

The following birds were identified during the three days migration, but what percentage they represented of the total numbers I regret I cannot say, as the far larger proportion of them passed unidentified:—Linnet (*Carduelis cannabina*), Chaffinch (*Fringilla cælebs*), Meadow-Pipit (*Anthus pratensis*), and Stonechat (*Saxicola torquata*). I did not identify the Starling (*Sturnus vulgaris*).

I was most struck by the compactness of the flocks—each separate and distinct with very few stragglers.

There was quite a different movement on November 20th, 1943, when streams of Chaffinches (*Fringilla cælebs*) passed along the coast from 1 to 5 p.m. During this time thousands of Chaffinches, flying rapidly and very low, were seen as they passed along in a continuous movement. The weather was clear with no wind. No further movement was seen after this date. N. V. ALLEN.

ABNORMAL BEHAVIOUR OF A RED-BACKED SHRIKE. THREE pairs of Red-backed Shrikes (*Lanius c. collurio*) normally occupy adjoining territories on Ruislip Common. In 1942 a fourth cock bird frequented the marsh. His behaviour was hardly normal, so I watched the cock Shrike who held this territory throughout the 1943 breeding-season very carefully and came to the conclusion that he practised bigamy. After mating with a hen he neglected her and spent several weeks courting another bird quite close to the sitting one. The second bird eventually built a ragged, exposed nest in a young willow. The cock took up a watching station midway between the two nests and returned to help the first hen with her brood after the second hen's nest had been robbed of its eggs.

T. L. BARTLETT.

WAXWINGS IN GREAT BRITAIN.

WITH reference to the invasion of Waxwings (*Bombycilla g. garrulus*), we are able to add the following reports to those previously recorded (*antea*, p. 196). It is evident that the immigration has been fairly widespread. We should be glad to receive records from any districts not yet mentioned in these pages, with a view to a further analysis.

SOMERSET.—The Rev. C. J. Pring reports one seen in a garden at Yeovil "just before Christmas" by Mr. S. Hutchings, who knows the bird well in captivity.

SURREY.—Four at Banstead, January 8th (A. W. Moss, *Times*, Jan. 25, 1944).

ESSEX.—Three at Althorne in January (C. B. Ashby).

HERTFORDSHIRE.—Mr. H. H. S. Hayward reports that three were seen by Mr. H. V. Gray on Berkhamsted Common on February 1st, and Mr. E. W. Arnold observed a party of a dozen or more on February 26th in a residential road in Rickmansworth bordered by high hawthorns. They were still there on March 12th.

MIDDLESEX.—One seen on the edge of Hampstead Heath by a reliable observer between Gainsborough Gardens and Heath Side on December 14th. (V. R. Garrett *per* London N.H.S.).

OXFORDSHIRE.—One at Bix (erroneously cited as "Bax"), near Henley, January 13th and again two days later (Mrs. E. M. Bantoft, *Times*, Jan. 25, 1944).

A party of eight to nine birds has been present in a locality on the northern outskirts of Oxford for several weeks, frequenting chiefly a small piece of hedgerow by a main road, adjacent to a garden containing a small pond at which the birds frequently drink. They were observed by W. B. Alexander, B.W.T. and others on February 21st, having been reported there two days previously,

and subsequently by a number of observers. As far as is known the last date on which they were seen was March 11th. There is some evidence that a considerably larger number was originally present, but this lacks positive confirmation by any ornithologist.

SUFFOLK.—Three seen five miles out of Stowmarket on the Bury St. Edmunds road, January 14th (J. M. Wallace, *Times*, Jan. 25, 1944).

GLOUCESTERSHIRE.—Mr. H. H. Davis informs us that one was seen on Clifton Downs by Mr. R. Poulding on October 30th. This is nearly a fortnight earlier than the first east coast record, but Mr. Davis is satisfied that the identification can be relied on and has given us particulars confirming this opinion.

WORCESTERSHIRE.—Mr. H. G. Alexander has informed us of one reported to him near Barnt Green through Mr. M. E. Pumphrey in early February, 1944. Also a flock reported at Bewdley on January 31st by G. C. Mackaness in local press.

WARWICKSHIRE.—Mr. Alexander also reports one seen by Mr. J. Shewell between Redditch and Studley on January 18th, and Mr. J. Spalding saw two at Handsworth, Birmingham, on March 4th and three in the same place on March 10th.

NOTTINGHAMSHIRE.—Mr. J. Staton reports: two seen at Gedling by himself on February 4th; one at Moorgreen Reservoir on February 13th by Messrs. J. S. and A. K. Gill; four at Colwick Woods on the east boundary of Nottingham on February 19th by R. J. Raines.

DURHAM.—Capt. D. I. Molteno informs us that numbers haunted the district of Barnard Castle from January 9th to 15th; one flock consisted of thirty-five birds and smaller numbers were seen in the same district for at least a week. Corporal P. A. Humble saw twenty at Bishop Auckland on December 13th.

FIRECREST IN IRELAND.

ON December 7th, 1943, when walking near Glengarriff, Co. Cork, we picked up underneath telegraph wires an adult male Firecrest (*Regulus i. ignicapillus*), which had been dead only a short while. This is the first known occurrence of the species in Ireland, and the specimen has been presented to the National Museum, Dublin.

J. E. FLYNN,
G. F. MITCHELL.

MID-AUGUST SONG OF GARDEN-WARBLER.

AT noon on August 16th, 1943, in a bushy dell at Drayton Beauchamp (Bucks) where a Garden-Warbler (*Sylvia borin*), presumably nesting, was in song during May and June, I watched and heard one singing steadily for three quarters of an hour within a few yards of where I was seated. This song, though including frequent bouts of a full minute's duration, was mainly a weaker version of the normal "spring" song, of which it lacked the ebullience and richness of tone. For almost half an hour, however, there were scarcely any pauses of more than a few seconds in the warbling.

On August 17th, between 1.30 p.m. and 2.30 p.m. at exactly the same spot, my wife and I heard the bird again singing. Except that it was less sustained, the pauses lasting longer, the song was similar in volume and timbre to that heard on the previous day ; but on two occasions when beginning a song-bout, the bird sang with all the " full-throated ease " and characteristic sweetness of the best Garden-Warbler in early June. On August 19th and thereafter I could find no signs of the singer at this haunt.

This was, in my experience, a very unusual date for the song of the Garden-Warbler—much more so indeed than September. H. G. Alexander, however, has apparently noted a weaker warbling version of the ordinary song in August and September (cited in *The Handbook of British Birds*, Vol. ii, p. 76.) BERTRAM LLOYD.

COURTSHIP DISPLAY OF BLACKBIRD.

My sister writes—" At 5 p.m. on January 20th, 1944, I watched a cock Blackbird (*Turdus m. merula*) displaying before a hen. He was sitting on the branch of a tree, and was swaying from side to side, bowing, and repeatedly wiping his beak on the bough. On closer investigation it was noticed that he was singing a sub-song of short phrases. The hen sat on a bough about a yard away very still, as if mesmerised." *The Handbook* account of the display of this bird does not mention either the swaying or the bowing noticed by my sister. The beak-wiping was no doubt a nervous act, due to excitement. It would appear that the above account may be of interest, as describing an uncommon form of display. M. BROOKS-KING.

[It is evident from the recorded data that the display actions of the Blackbird, as in the case of some other Passerines, show wide variation and conform to no well-defined pattern.—B. W. T.]

EAGLE-OWL IN YORKSHIRE.

ON December 17th, 1943, in Yarker Bank Plantation, a mixed wood of several acres about one mile from Leyburn, Wensleydale, Yorks, I was attracted by a great commotion amongst the birds. Mistle-Thrush, Blackbird and Fieldfare were all in the utmost agitation, and never before have I seen Wood-Pigeons exhibit such signs of real panic. At first, I could see nothing to account for this, and my appearance made no difference to the distraught behaviour of the birds ; but suddenly, after I had been standing for some time beneath a beech, an enormous bird swept low down. That it was an owl was unquestionable from its shape and silent flight. The upper plumage was dark with reddish mottling or edging to the feathers ; the head was dark, with what appeared as a short, thick darker line down each side. There were tufts or " ears," because they " feathered " with the breeze. The wings and tail were dark and definitely barred. The bird flew along the glade for about 100 yards at about four feet from the ground and then swung up into a pine. During its passage the birds went almost frantic. I followed up, but could only get fleeting glimpses of the great bird before it again flew low down and away to a distant wood. The

short glimpse in the pine showed an exceptionally large bird standing very erect. The under-parts were lighter and mottled or streaked, but I could get no detail. The face was that of an owl and the ear-tufts were visible. The size and colouring of the bird appear to indicate an Eagle-Owl (*Bubo b. bubo*). J. P. UTLEY.

[The description leaves no doubt that the bird was an Eagle-Owl. The particulars which Capt. Utley is able to give would not entirely preclude its having been one of the non-European Eagle-Owls escaped from captivity rather than *Bubo bubo*, but the possibility that it might have been some such other species seems so slight as to be hardly worth entertaining.—EDS.].

WOOD-SANDPIPER IN GLOUCESTERSHIRE.

ON August 13th, 1943, at the edge of a small, rushy woodland pool on a lower slope of the Cotswolds near St. Catherine's, I saw a brown and white sandpiper probing in the mud, which proved to be a Wood-Sandpiper (*Tringa glareola*). It was possible to get within about ten yards of the bird owing to cover provided by some reeds. It was a dainty bird, somewhat smaller than a Green Sandpiper (*Tringa ochropus*) and the sepia brown back was patterned with white markings. On being flushed it rose obliquely to about 30 feet, circled and returned to the same position. In flight it did not appear so black and white as the Green Sandpiper and showed a white rump (though this was less conspicuous than in that species) and had a barred tail. The call, on flushing, was a shrill triple note, which I found difficult to describe but wrote down as "chree-ree-ree" (all of the same pitch).

After feeding for about five minutes the bird again towered and did not return. On this occasion the triple call note was followed by a more liquid "too-ee." There was no white wing-bar and head neck and throat were streaked with brown.

W. D. MELLUISH.

NOTES ON REDSHANK FLEDGING.

THE following observations on the fledging of Redshanks (*Tringa totanus britannica*) were made in 1943.

A brood of four were ringed on the day of hatching, May 19th. Twenty-five days later, on June 13th, a calm day, one of this brood, after fluttering for a few yards just above the long grass, was caught and the following particulars of development taken down.

Bill: greenish brown, tip black; length $1\frac{3}{16}$ ins.

Legs: pale yellowish amber; tarsus length 2 ins. Middle toe: $1\frac{3}{8}$ ins.

Second primary: length $2\frac{5}{8}$ ins.

Feathers had replaced down on all parts of the body except cheeks and nape. Down was adhering to the tips of the inner primaries, secondaries, some wing-coverts, back, rump, tail, under tail-coverts and some breast feathers. The under wing-coverts were still sheathed, the longest being $\frac{3}{4}$ in.

On the twenty-sixth day, during a heavy rain squall, when a fair wind was blowing, I turned up one of the brood. With quickly

fluttering wings it rose to about 20 ft., flying over a wide ditch to alight about 60 yards away.

On the twenty-eighth day at the same spot I came upon probably the same nestling. The evening was quite calm and I approached cautiously, hoping the youngster would crouch in the long grass. It began to retreat, bobbing in characteristic style, then decided to go no further. As I continued to advance it took wing, flying apparently fairly easily at a height of about 15 to 20 ft and for about 200 yards. Turned up again within five minutes, it flew back, this time about 300 yards.

The thirty-fourth day was quite calm too, and the flight and appearance on the wing of one of these juveniles was quite like that of the adult birds, one, at least, of which was still attending the young. On the ground the young bird was easily distinguished by its manner, as well as by the ring, which was easily discernible.

P. A. RAYFIELD.

GREENSHANK'S MODE OF FEEDING

WHILE at Hoylake, Cheshire, on the Dee estuary, on August 27th, 1943, I watched a Greenshank (*Tringa nebularia*), which in addition to its normal mode of feeding, frequently employed the method described by Major A. W. Boyd in *The Handbook*, running with its head submerged. On five occasions, however, its whole head and body were under water, so that all that was seen was its tail moving along, sometimes at considerable speed.

As far as I could see the prey was invariably a small fish, and when the bird was successful in capturing one it would run to the side and then put the fish on the sand and proceed to eat it, a method of operation no doubt determined by the depth of the water.

G. IAN LACEY.

DISPLAY OF THE COOT.

THE following note on the display of the Coot (*Fulica atra*), observed at Eaton Hall, Cheshire, contains some features not mentioned in *The Handbook*.

Two Coots were in the centre of the fish pond here, when two more came up from different directions, running on the surface of the water with the neck curved down so that the beak almost touched the water, instead of holding their heads up in the usual manner. These two went into the aggressive posture as described in *The Handbook*, and each swam round in small circles, apparently not taking any notice of the other. The two pairs then separated, each pair containing one of the two which had displayed.

JOHN BARLEE.

MAGPIES AND ROOKS PERCHING ON THE BACKS OF ANIMALS.—Mr. C. H. Cooke reports that he saw several Rooks (*Corvus f. frugilegus*) perching on the backs of reclining sheep near Pinner, Middlesex, on April 11th, 1937, and evidently searching for pests in the wool, and Mr. D. H. Naylor reports a Magpie (*Pica p. pica*) seen perching on the back of a pig and picking something off, near

Bewdley, Worcestershire, on January 23rd, 1944. The correspondence on this subject (*antea*, pp. 159 and 199) is now closed, unless any correspondents succeed in definitely identifying the parasites being taken by the birds. The reference to Mr. F. A. H. Low in the previous note (p. 199) should have been to Mr. F. A. H. Coon.

ENTRANCE TO NUTHATCH'S NESTING-HOLE ENLARGED AND NO MUD USED.—With reference to Capt. J. P. Utley's note under this heading (*antea*, p. 95) Mr. P. S. Burns informs us of a similar case observed at Mill Hill, Middlesex, in May, 1937. The birds chose a natural hole 30-40 ft. up in an oak and after some days' occupation began enlarging the entrance until there was about half an inch of white wood all round. No mud was used at this nest, which was under close observation until after the young had flown.

LARGE FLOCK OF LONG-TAILED TITS.—Lt.-Col. J. R. Kennedy informs us of a flock of just over fifty Long-tailed Tits (*Ægithalos caudatus rosaceus*) seen in a plantation in Essex in January, 1944. So large a number of these birds together is in our experience unusual, though flocks of at least double this size are observed on occasions.

PROLONGED TRILL OF WOOD-WARBLER.—With reference to Mr. H. R. Tutt's note on the prolonged trill used by a Wood-Warbler (*Phylloscopus sibilatrix*) in Surrey in June, 1943 (*antea*, p. 159), Mr. H. J. Hoffman informs us that he heard a similarly prolonged trill used by an unmated male in another Surrey wood. It was first heard on May 20th, but after a week it apparently left, having failed to secure a mate. Mr. Tutt's bird was mated and the nest was found partly built on June 23rd. This date would normally indicate a second nest built after the destruction of an earlier one, and Mr. Tutt is of opinion that this is what had in fact taken place, but the possibility that the male might have been actually Mr. Hoffman's bird, which had finally secured a mate, is not entirely ruled out, the localities being some ten to eleven miles apart.

LATE DRUMMING OF GREAT SPOTTED WOODPECKER.—With reference to the notes under this heading (*antea*, p. 160), Mr. B. T. Brooker informs us that he heard one drumming at Fawley Court, near Henley-on-Thames on November 28th, 1943, and Mr. E. W. Hendy reports that he heard one on December 1st, 1912, at Alderley, Cheshire, when snow was on the ground.

LONG-TAILED DUCKS INLAND ON CORNWALL-DEVON BORDER.—Mr. A. C. Leach has sent us particulars of two Long-tailed Ducks (*Clangula hyemalis*) in first winter plumage seen on January 4th, 1944, on Tamar Lake near Bude, about $5\frac{1}{2}$ miles inland on the borders of Devon and Cornwall. The Reports of the Devon and Cornwall Bird-Watching and Preservation Societies, from 1929 and 1930 respectively, contain no inland records, with the exception of one for November 19th, 1938, for the same locality.

PUFFIN ON THAMES IN LONDON.—Messrs. W. R. Philipson and T. Bispham report an immature Puffin (*Fratercula arctica grabæ*) on the Thames opposite Chiswick Mall on January 3rd, 1944. The weather was mild with high south-west wind.

REVIEWS.

LOCAL REPORTS.

Ornithological Report for the County of Hampshire, 1941. By F. H. Haines. (Reprinted from *Proc. Hampshire Field Club and Archæological Soc.*, Vol. xv).

IN our opinion this report would have been benefited by the omission of numerous trivial and doubtful records. It is difficult for instance to believe that there is any district in Hampshire (or in England) where it is worth while recording that a few Great Tits were seen during the winter or that three were seen together on a bird-table, or that a Heron was seen. We note that one Dartford Warbler was seen on a heath on the west side of Bournemouth, from which they had apparently been absent for two years. Several records from Dorset are included, though it would seem more appropriate for them to appear in the report for that county.

Report on Dorset Natural History, 1941. By The Rev. F. L. Blathwayt. (Reprinted from *Proc. Dorset Nat. Hist. and Archæological Soc.*, Vol. lxiii).

IN the section on birds in this report it is stated that the Dartford Warbler has apparently not yet recovered, though one observer speaks of it as "holding out." It is interesting to learn that Buzzards now breed regularly in one locality in West Dorset to which they appear to have spread from Devon. There are few previous records of nesting in the county. The Curlew has also only recently colonized the west of the county, though it has long been known to breed in the east. The Garganey is recorded as breeding in Hampshire not far from the Dorset border and a Corn-Crake was heard over the county boundary, though neither of these species is mentioned in the Hampshire report. Could not local recorders in adjacent counties agree to exchange records, so that they should appear in the right place?

The London Bird Report for 1941. Edited by R. S. R. Fitter. (Supplement to *The London Naturalist*). 1s. 6d.

IN addition to the annotated list, this report contains an article by E. D. and E. R. Parrinder on a Hoopoe at Enfield. It appears to have been an unusually shy individual, which was frequently heard calling, but was only seen by the writers on June 8th, 1941, and glimpsed on June 22nd. It was heard by various other people, and local residents reported that it had been calling since the first week in May. Most of the other uncommon birds observed during the year have already been recorded in this journal. A Corn-Crake was watched feeding young at Westerham, Kent in June, a Stone-Curlew seen on Chingford Plain, Essex in April, and a pair of Mealy Redpolls seen in April at Tadworth, Surrey.

South-Eastern Bird Report, being an Account of Bird-life in Hampshire, Kent, Surrey and Sussex during 1941. Edited by R. Whitlock. (Webb's Farm, Pitton, Salisbury, Wilts.). 5s. od.

IN the Surrey section, which is very brief, we note that three pairs of Buzzards nested in Witley Park, where we understand they were originally introduced from Wales and liberated after a period of confinement in an aviary. In the Kent section it is recorded that Buzzards were unusually common in East Kent in autumn and that Bitterns were seen in the East Kent marshlands in every month from July to December. In the same area a Temminck's Stint was identified on August 23rd and a Continental Redshank was shot on May 14th. In Sussex, Mr. Walpole-Bond reports that the Dartford Warbler is nearly extinct; a pair of Ravens reared a brood on the cliffs for the third year in succession; and a pair of Curlews again nested in Ashdown Forest, but apparently without success. The Hampshire section is a reprint of the Hampshire Field Club Report.

Report on Birds observed in Hertfordshire in 1941. By Bertram Lloyd.
(*Trans. Herts. Nat. Hist. Soc. and Field Club*, Vol. xxi).

THIS report contains a number of interesting records. A Robin's nest with two young birds and one egg was found on December 16th, near Smallford railway station, and a few days later the nest contained three young. A Marsh-Warbler was singing on the bank of Wilstone Reservoir, Tring, on June 24th and July 4th where it was identified by Mr. Lloyd and on the second occasion also watched by Mrs. Lloyd. This is the first record of the species in the county. Stone-Curlews are reported still to breed regularly in the Royston district. The roosting of gulls on the Tring reservoirs has been studied by Mr. W. E. Glegg, who found between 2,000 and 3,000 Black-headed Gulls present in the middle of February and nearly 3,000 in December. In the latter month they were joined by a few Common and Herring-Gulls, species not known to have roosted there previously. A Great Black-backed Gull was seen at the reservoirs on December 5th. There are very few previous records of this species.

Ornithological Report for Northumberland and Durham for 1942. Compiled by G. W. Temperley. (*The Naturalist*, July-September, 1943).

THIS report is much shorter than usual, but contains some interesting items. A severe wintry spell from early January to the middle of March seriously affected the numbers of resident birds especially Song-Thrushes, Hedge-Sparrows and Wrens. A pair of Nuthatches came regularly to feed at a bird-table at Wall, Northumberland, for about two months from February 17th, but apparently left before the breeding-season. It is very many years since the species was recorded in Northumberland, though it is continuing to spread northward in Durham. Green Woodpeckers are said to be increasing rapidly in the Upper Derwent Valley. A pair of Goosanders remained on the Coquet, near where they attempted to breed in 1941, until April 25th, but no nest was found, and a pair was seen on the Tyne near Bywell as late as April 13th.

W.B.A.

LETTER.

TERNs MIGRATING WEST IN SPRING.

To the Editors of BRITISH BIRDS.

SIRS.—In Sub.-Lieut. Eric Duffey's note (*British Birds*, Vol. xxxvii, pp. 117-118) on the trans-Atlantic migration of terns in spring, he quotes me as being unable to give any actual observations of Arctic Terns migrating from east to west in my paper on North Atlantic birds (*Proc. Boston Soc. Nat. Hist.*, Vol. xl, 1935). However, on p. 327 I stated that a total of 24 terns were seen by me in the pelagic zone in May and June, 1933, and that their mean direction of flight was W.N.W. (Actually eleven of these were in the mid-Atlantic area between 20° and 45°W; three were south of Ireland, and ten near the Grand Bank). On pp. 325-326, previous spring observations by Max Nicholson and by Finn Salomonsen are mentioned.

One may hope that other ornithologists now on naval service will publish their observations, and thus make them available to those who are interested in the birds of the Atlantic and other oceans. V. C. WYNNE-EDWARDS.

McGill University,
Montreal. 25.11.43.

[Sub.-Lieut. Duffey's record was of numerous flights of terns on two successive days all travelling west. We do not think Prof. Wynne-Edwards's records of 24 birds flying in various directions over a period of two months with a mean W.N.W. direction can be regarded as a comparable observation of migration, whilst Messrs. Nicholson and Salomonsen merely recorded terns seen out of sight of land in the North Atlantic.—EDS.]

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EDITORIAL: VOLUME XXXVIII.

British Birds was started in June, 1907, and since then the volumes have always run from June to May. It appears to me, however, that there are marked advantages in having the volume coincide with the calendar year. It has therefore been arranged that the forthcoming Volume, xxxviii, shall run until December, 1945, instead of June, so that subsequent volumes may begin in January. The subscription forms for Vol. xxxviii have been adjusted accordingly, and I hope our readers will approve of the change. B.W.T.

BIRDS OF INNER LONDON

BY

G. CARMICHAEL LOW.

DURING 1943 there have been no new records for Inner London. Another big invasion of Black Redstarts (*Phœnicurus o. gibraltariensis*) took place and several pairs nested (*cf. antea*, pp. 191-195). Though nothing specially rare was reported some of the occurrences are quite interesting and are now given. Many observers are still away and notes as a result are still somewhat scanty.

ADDITIONAL NOTES IN 1943.

CARRION-CROW (*Corvus c. corone*).—One or two in Kensington Gardens and the other Inner London Parks (G.C.L.). A pair in St. James's Park, December 16th (J. L. Bartlett).

JACKDAW (*Corvus m. spermologus*).—Nesting took place again in the S.W. corner of Kensington Gardens, four holes being occupied; later some young ones were seen. In November all the birds disappeared for a time, but some returned in December. Twenty was the maximum seen at any time (G.C.L.).

JAY (*Garrulus g. rufitergum*).—Mrs. Lilian Cox reported on May 12th, that a pair were starting to build a nest in a tree by the Police Station in Hyde Park. I watched the spot for some time, but nothing came of it, the birds eventually stopping the building and deserting the site. Several (up to three in number) have frequented Kensington Gardens all the year and it looks as if they had taken up a permanent residence there now (G.C.L.). Sir Cyril Hurcomb writes that he has seen more in Hyde Park (also St. James's Park) than in Kensington Gardens this year.

GREENFINCH (*Chloris c. chloris*).—A pair nested in the Flower Walk, Kensington Gardens (G.C.L.); one calling regularly near Long Water since April 29th (B. A. Richards). Party of five seen in a Chelsea square feeding on seeds of deserted cabbages (W. J. L. Sladen).

SKY-LARK (*Alauda a. arvensis*).—Ten flying S.W. over Moorgate Street, October 12th (E. G. Pedler). A few seen between mid-October and mid-November in waste ground opposite Knightsbridge barracks (Sir Cyril Hurcomb).

MEADOW-PIBIT (*Anthus pratensis*).—One in Hyde Park on waste ground near gun site, February 22nd (G.C.L.); migration over Temple on September 17th noted by Howard Bentham between 6.25 and 6.35 a.m. (Greenwich Mean Time).

YELLOW WAGTAIL (*Motacilla f. flavissima*).—By Moorgate Metropolitan Station, an adult and an immature, August 17th (E. G. Pedler).

GREY WAGTAIL (*Motacilla c. cinerea*).—One by the Serpentine, September 28th; one on gravel floor of one of the empty basins, head of Long Water, October 14th (G.C.L.); one by rainpool in

Moorgate Street, October 5th (E. G. Pedler) ; one in ruins of Temple, September 16th ; one passing north over Holborn, September 30th (Howard Bentham) ; one frequented the water-tanks in Berkeley Square between September 21st and late October and one seen on November 12th at end of Serpentine (Sir Cyril Hurcomb) ; one at static tanks in Farringdon Road, December 11th (J. S. Beesley).

PIED WAGTAIL (*Motacilla a. yarrellii*).—Twice seen in empty basins, head of Long Water, October (G.C.L.). One crossing Moorgate Street, October 5th (E. G. Pedler). One passing south over Holborn, September 25th and one on lawn of Middle Temple Gardens, October 6th (Howard Bentham).

TREE-CREEPER (*Certhia f. britannica*).—One seen in Kensington Gardens, January 11th (Miss M. S. van Oostveen) and again January 12th (G.C.L.). Another, March 19th (M.S.v.O.) ; also one on March 17th and March 29th (B. A. Richards). Sir Cyril Hurcomb writes that he saw two chasing each other in Kensington Gardens on February 8th ; a single bird at same place on March 12th and one again on April 2nd.

NUTHATCH (*Sitta e. affinis*).—Mr. R. Preston Donaldson saw one in Holland Park grounds on September 19th.

GREAT TIT (*Parus m. newtoni*).—Two or three frequented the Temple Gardens, October 1st to 8th (Howard Bentham). Seen from time to time in Kensington Gardens (G.C.L.). W. T. L. Bartlett saw one in the Green Park on May 9th.

COAL-TIT (*Parus a. britannicus*).—Some with a party of mixed tits in Flower Walk, Kensington Gardens, end of September (Sir Cyril Hurcomb).

SPOTTED FLYCATCHER (*Muscicapa s. striata*).—Three pairs nested in Kensington Gardens this year (G.C.L.). Seen also by W. B. A. Richards. One, Shepherd's Bush Green, June 28th (T. L. Bartlett). Sir Cyril Hurcomb saw four or five on May 20th in Kensington Gardens ; last seen on August 19th.

GOLDCREST (*Regulus r. anglorum*).—Miss M. S. van Oostveen heard one on October 15th near Peter Pan, Kensington Gardens. Two in Lincoln's Inn Fields, October 8th (Prof. E. H. Warmington).

CHIFFCHAFF (*Phylloscopus c. collybita*).—One calling by Peter Pan, Kensington Gardens, September 2nd (G.C.L.) ; two in Regent's Park, September 25th (Prof. E. H. Warmington).

WILLOW-WARBLER (*Phylloscopus t. trochilus*).—One or two passing through Kensington Gardens on migration (G.C.L.) ; one in devastated area round Fetter Lane, September 17th (Howard Bentham) ; one singing, Kensington Gardens, August 27th (M.S.v.O.) and one September 25th (G.C.L.).

BLACKCAP (*Sylvia a. atricapilla*).—One singing in bushes behind Peter Pan, May 11th (G.C.L.).

WHITETHROAT (*Sylvia c. communis*).—Mr. Howard Bentham saw one on August 25th, amongst some tall weeds and shrubs in a devastated area close to Fleet Street.

LESSER WHITETHROAT (*Sylvia c. curruca*).—One singing in Kensington Gardens, S.W. of Serpentine Bridge at same place as last year, June 17th; not heard again (G.C.L.). Sir Cyril Hurcomb heard one in Hyde Park on July 2nd.

MISTLE-THRUSH (*Turdus v. viscivorus*).—Nested by Tea House, Kensington Gardens; feeding young, May 21st (G.C.L.); one, Regents Park, September 3rd (Howard Bentham).

REDWING (*Turdus musicus*).—Mrs. Rait Kerr saw one in her garden in St. John's Wood, November 21st.

WHEATEAR (*Ænanthe æ. ænanthe*).—Miss E. M. Wyatt reports one (a male) by the Round Pond, Kensington Gardens, March 21st.

BLACK REDSTART (*Phœnicurus o. gibraltariensis*).—Many reported again during summer with several records of nesting—Temple, Fetter Lane, Charterhouse, etc. For full details *vide* R. S. R. Fitter (*l.c.*).

SWALLOW (*Hirundo r. rustica*).—Howard Bentham reports four passing south, over the Temple, on September 17th.

HOUSE-MARTIN (*Delichon u. urbica*).—A migration over Kensington High Street, 9.15 a.m., September 19th (R. Preston Donaldson). One over St. James's Park Lake, June 15th (R. S. R. Fitter).

SAND-MARTIN (*Riparia r. riparia*).—Three passing over Holborn area, May 13th (Howard Bentham). Two over St. James's Park Lake, May 3rd (A. V. Tucker).

SWIFT (*Apus a. apus*).—Two over St. James's Park Lake, June 15th (R. S. R. Fitter).

GREAT SPOTTED WOODPECKER (*Dryobates m. anglicus*).—Seen frequently in Kensington Gardens during the year (G.C.L., B. A. Richards, C. Dolley). Noted on August 27th by Miss M. S. van Oostveen. No evidence of nesting this year. One picked up dead in Kensington Gardens, November 24th by a lady and taken to the Natural History Museum (G.C.L.); one in a garden behind Kent House, Kensington Court, December 7th, cutting a hole in an ash tree (Mrs. Carmichael Low).

LESSER SPOTTED WOODPECKER (*Dryobates m. comminutus*).—One seen, Kensington Gardens, October 15th (M.S.v.O.); one, Regent's Park, September 25th (Prof. E. H. Warmington).

CUCKOO (*Cuculus c. canorus*).—One calling May 24th in Kensington Gardens (J. C. Dibben); one heard and seen, morning of May 6th on the Island at Buckingham Palace end of St. James's Park Lake (*per* T. L. Bartlett).

KINGFISHER (*Alcedo a. ispida*).—One, Long Water, Kensington Gardens, August 27th and October 11th (M.S.v.O.); one at lake in St. James's Park, November 2nd (T. L. Bartlett).

LITTLE OWL (*Athene n. vidalii*).—Mr. B. A. Richards heard one calling from the trees near High Street Kensington Station at 7.45 a.m. (Summer Time) on January 4th.

TAWNY OWL (*Strix a. sylvatica*).—A pair, or possibly more in Kensington Gardens; no nest definitely located, but one bird often seen sitting out at mouth of a hole in March and April; one constantly in a tree near bandstand in Hyde Park (Sir Cyril Hurcomb).

KESTREL (*Falco t. tinnunculus*).—Miss Monica Curtis reports one in Warwick Road, April 24th; one only seen in Kensington Gardens during year and no nest at the Imperial Institute (G.C.L.); one over Shepherd's Bush, June 25th (T. L. Bartlett); one over Berkeley Square, October 1st (Sir Cyril Hurcomb) and pair over Lords Cricket Ground, December 23rd (Mrs. Rait Kerr); one, Westminster Abbey, April 19th (R. S. R. Fitter); one perched on the gasometer, Battersea Park, September 7th (C. B. Ashby); one over Baker Street Station, September 25th (Prof. E. H. Warmington).

SPARROW-HAWK (*Accipiter n. nisus*).—Mr. R. W. Hayman saw one on October 11th perched on the Central Tower of the Natural History Museum at South Kensington and again on November 15th he saw one fly across the Museum from the south, heading towards Kensington Gardens. Miss C. E. Longfield saw a male swoop on Sparrows in Cadogan Place Gardens, March 18th, and J. S. Beesley saw a similar thing in St. James's Park, December 6th.

HERON (*Ardea c. cinerea*).—One frequented the Long Water, Kensington Gardens again this year (G.C.L. and B. A. Richards); one, Regent's Park, island nearest Boat House, March 5th (Mrs. J. B. Priestley).

SHELD-DUCK (*Tadorna tadorna*).—A single bird, with appearance of being wild, on Serpentine on March 19th (Sir Cyril Hurcomb).

MALLARD (*Anas p. platyrhynchos*).—Again bred in A.F.S. tank, Victoria Street, S.W.1 and brought up two young ones. Miss Martineau reports that when some people she knew were feeding the duck and sparrows at the Lake in Regent's Park, a female Mallard twice seized a sparrow and on each occasion took it to the water and drowned it. Mr. Bartlett also reports that he saw a female Mallard seize a living sparrow and swim across with it to the island in St. James's Park.

POCHARD (*Aythya ferina*).—The Pochards wintering on the Round Pond have increased again this autumn. After the raids of 1940 and 1941 their number was much reduced. These wild birds used to come in October before the war, and stay till the end of March, numbers up to 40 or more often being recorded.

SCAUP (*Aythya m. marila*).—A drake of this species was seen on the lake in St. James's Park by Mr. Hinton, the keeper, on January 16th, 1943 and it stayed till February 10th. Mr. L. G. Duke reported the occurrence in *The Times* on February 8th. Mrs. J. B. Priestley saw the same bird or another one on March 11th. A pinioned bird of the same species lived on the lake for several years. From time to time specimens are seen on the Round Pond and

Serpentine and there was one on the lake in St. James's Park in 1942 also. Mr. Bartlett reports yet another one (a female) on December 2nd, 1943 and another male was present on December 29th and 30th (Mrs. J. B. Priestley and G.C.L.).

TUFTED DUCK (*Aythya fuligula*).—One with five young ones in basin at head of Serpentine, July 22nd (G.C.L.). Several broods on the Lake in St. James's Park, not so numerous as formerly however. Over 300 adults present on Lake, December 30th (G.C.L.).

SMEW (*Mergus albellus*).—Dr. J. S. Carter saw a red-headed bird on St. James's Park Lake on February 24th.

GREAT CRESTED GREBE (*Podiceps c. cristatus*).—One Serpentine, June 22nd (Sir Cyril Hurcomb).

LITTLE GREBE (*Podiceps r. ruficollis*).—One, N.E. corner of Long Water, April 16th (B. A. Richards); one on Round Pond, Kensington Gardens, August 27th (G.C.L.); one, St. James's Park Lake, September 11th (A. V. Tucker); five young ones by the island at east end of St. James' Lake, November 2nd (T. L. Bartlett); one on Lake in St. James's Park, November 18th and 22nd (Mrs. J. B. Priestley); two ditto, December 30th (G.C.L.).

STOCK-DOVE (*Columba ænas*).—At least three pairs in Kensington Gardens in early part of season; one pair nested; disappeared later and may have been shot (G.C.L.). Also noted in early July by C. Dolley.

TURTLE-DOVE (*Streptopelia t. turtur*).—One Kensington Gardens, July 19th (G.C.L.).

COMMON SANDPIPER (*Tringa hypoleucos*).—One crossed over the Round Pond, May 4th; one on river by Battersea Park, August 29th (G.C.L.). One at St. James's Park Lake, August 9th (J.S. Beesley).

LAPWING (*Vanellus vanellus*).—Mr. Preston Donaldson saw four flying over Notting Hill on June 17th. Mrs. Rait Kerr reports that a flock of 18 passed over Lords Cricket Ground on December 30th.

COMMON TERN (*Sterna h. hirundo*).—One at the Round Pond, Kensington Gardens, May 11th and one on the Long Water, some fifteen minutes later, possibly the same bird (G.C.L.).

LESSER BLACK-BACKED GULL (*Larus f. graellsii*).—One frequented the Long Water during the year; a Scandinavian one (*L. f. fuscus*) also seen there, September 25th, as well as one on the Lake in Regent's Park, March 9th (G.C.L.).

CORN-CRAKE (*Crex crex*).—Mr. Howard Bentham writes as follows: "Corn-crake: On October 11th I found a dead bird in quite fresh condition in Red Lion Court, Fleet Street, E.C.4. The night of the 10th and early morning of the 11th were very foggy and the bird probably came to grief on this account." Mr. Holte Macpherson in his "Birds of Inner London," *Brit. Birds*, Vol. xxii, 1929, p. 244, drew attention to one found floating dead on the Serpentine on October 6th, 1913 by Mr. C. A. Cresswell.

A PUBLICATION OF THE BRITISH TRUST FOR ORNITHOLOGY.

REPORT OF THE BIRD-RINGING COMMITTEE:

PROGRESS FOR 1943.

A. LANDSBOROUGH THOMSON, C.B., D.SC.

Chairman of the Committee.

THIS is the seventh report* issued on behalf of the Bird-Ringing Committee of the British Trust for Ornithology, continuing the earlier sequence of reports by H. F. Witherby published under the title "*The British Birds Marking Scheme.*" Activities have continued to be restricted by war conditions.

MANAGEMENT.

The headquarters of the scheme remain in the British Museum (Natural History), by permission of the Trustees, and rings are inscribed "BRITISH MUSEUM NAT. HIST. LONDON."

The death of Mr. Witherby deprives the Committee of the advice of the original founder of the scheme, who personally conducted the work for many years and did so much to establish ringing on a sound basis in this country. Otherwise the membership remains unchanged.

Miss E. P. Leach, Honorary Secretary of the Committee, has continued to undertake the whole of the headquarters work. The warmest thanks of the Committee are due to her for the way in which she is maintaining the scheme single-handed in the present difficult times.

FINANCE.

With expenditure naturally at a low level, the financial position continues to be satisfactory.

PROGRESS OF RINGING.

The number of birds ringed is almost the same as in 1942—but of course very much less than in a normal year. There has been some further drop in the number trapped, counterbalanced by an increase in the number of nestlings ringed.

Mr. K. Williamson has done further ringing in the Faeroes where he is stationed on military service, but has not had the same good fortune as last year as regards recoveries.

Mr. Bartlett, of the London Natural History Society, has ringed a hundred Black-headed Gulls caught by hand in the parks and on the riverside. Messrs. Ash and Ridley have sent in a list which includes forty-six species, and Mr. A. E. Billett has ringed such unusual subjects as Wood-Lark, Grasshopper-Warbler and Cirl Bunting. "Wippletree" have continued their intensive ringing of Dippers, marking sixty and recovering two previously ringed in the same dale.

Black Redstarts were ringed both in London and at Lowestoft. No less than fifteen young Marsh-Harriers were marked in Norfolk.

*The previous report was published in *Brit. Birds*, Vol. xxxvi, pp: 209-213.

Reference has already been made in these pages (*antea*, p. 211) to the death of Dr. H. J. Moon, who was responsible for ringing the huge total of nearly 78,000 birds under the scheme. His remarkable contribution to the ringing effort resulted in many records of great interest.

RECOVERIES.

Individual recovery records of interest include an Oyster-catcher ringed in the Faeroes and recovered in Caithness, and a Wigeon bred in Ross-shire and reported from near the Dardanelles. A Pied Wagtail ringed in the nest at Ambleside was recovered at Kendal, eleven miles distant, nine days later. A Black Redstart ringed at the Charterhouse, London, was recovered at Southgate, seven miles away, six weeks later. A Gannet marked on Grassholm was recovered near Skye in June at the age of five years, indicating a desertion of its native breeding-site.

Help has again been received from the National Museum of Ireland and the Natural History Museum at Göteborg in obtaining marking details of birds ringed abroad and recovered in the British Isles. Communication has also been possible with Moscow through the kindness of the Soviet Embassy in London.

PUBLICATION OF RESULTS.

The following publications have been made under the auspices of the Committee since the last report :—

E. P. Leach (1943): "Recovery of Marked Birds." *Brit. Birds*, Vol. xxxvi, pp. 235-240.

A. Landsborough Thomson (1943): "The Migration of the Sandwich Tern: Results of British ringing." *Brit. Birds*, Vol. xxxvii, pp. 62-69.

D. Lack (1943-44): "The Problem of Partial Migration." *Brit Birds*, Vol. xxxvii, pp. 122-130, 143-150.

Mr. Lack has also made use of ringing data in his book on *The Life of the Robin* (1943). Miss Leach has published further records of Scandinavian Herring-Gulls ringed on the Murman coast and recovered in Great Britain (*Brit. Birds*, Vol. xxxvii, p. 159).

NUMBER OF BIRDS RINGED.

					<i>Trapped.</i>	<i>Nestlings.</i>	<i>Total.</i>
In 1943	..	..	..	..	660	3,920	4,580
„ 1942	..	..	..	..	1,301	3,266	4,567
„ 1941	..	..	..	..	3,109	3,990	7,099
„ 1940	..	..	..	..	14,974	6,208	21,182
„ 1939	..	..	..	..	27,983	27,834	55,817
„ 1938	..	..	..	..	24,162	26,162	50,324
„ 1937	..	..	..	..	21,900	23,281	45,181
„ 1936	..	..	..	..	19,235	29,428	48,663
„ 1935	..	..	..	..	16,066	30,364	46,430
„ 1934	..	..	..	..	17,835	31,816	49,651
From 1909 to 1933	..	..	..	..	..	..	385,989
Grand Total (including arrears)					720,217		

INDIVIDUAL TOTALS FOR 1943.

	Trapped	Nest- lings	Total		Trapped	Nest- lings	Total
Cowin, Ladds & Williamson ...	21	568	589	H. Tully ...	14	5	19
London N.H.S. ...	146	243	389	Gresham's Sch. ...	4	14	18
Ash & Ridley ...	94	218	312	M. Hardy ...	—	17	17
R. H. Brown ...	3	287	290	W. B. Maltby ...	6	11	17
A. E. Billett ...	4	241	245	Shrewsbury Sch. ...	1	14	15
A. Darlington ...	6	148	154	C. P. Taylor ...	—	15	15
A. H. Johnson ...	5	145	150	Uppingham Sch. ...	2	13	15
A. W. Boyd ...	3	133	136	P. A. Rayfield ...	—	14	14
R. Walker ...	3	110	113	R. Carrick ...	—	13	13
H. M. Rogers ...	1	111	112	Miss Morris ...	3	10	13
"Wippletree" ...	19	91	110	M. & D. Rankin ...	2	11	13
Mr. & Mrs. Hirst ...	4	90	94	Mmes. Anscombe & Read ...	1	11	12
R. F. Rutledge ...	—	94	94	J. Vincent ...	—	12	12
F. J. Brown ...	—	86	86	A. F. Airey ...	1	10	11
J. Bartholomew ...	1	84	85	Repton Sch. ...	—	11	11
Bootham Sch. ...	31	53	84	G. Charteris ...	—	10	10
R. Martinson ...	—	81	81	J. M. B. King ...	6	4	10
Oxford Orn. Soc. ...	49	29	78	Cambridge B.C. ...	9	—	9
T. Bagenal ...	4	67	71	Sedbergh Sch. ...	2	7	9
A. H. Bishop ...	8	61	69	R. M. Band ...	—	8	8
B. Campbell ...	5	63	68	Miss J. Ferrier ...	1	6	7
Mrs. Hodgkin ...	2	66	68	C. F. Tebbutt ...	1	6	7
C. Oakes ...	1	60	61	A. Buxton ...	—	6	6
A. K. Weatherhead ...	—	52	52	F. W. Fox ...	1	5	6
Lord D. Stuart ...	35	15	50	F. J. Ramsey ...	6	—	6
L. G. Weller ...	38	12	50	D. Whicher ...	—	6	6
Miss R. Levy ...	—	40	40	T. H. Bell ...	—	4	4
M. K. Colquhoun ...	38	—	38	Seton Gordon ...	—	4	4
P. A. Roberts ...	6	31	37	E. Jeffrey ...	—	4	4
C. Q. Phillipson ...	2	33	35	M. S. Brett ...	3	—	3
H. C. Trimmell ...	1	31	32	L. P. Samuels ...	2	1	3
E. Cohen ...	2	25	27	L. D. Thomas ...	3	—	3
Rugby Sch. ...	5	21	26	Woodcock Inq. ...	—	3	3
D. Hunter ...	—	24	24	R. Chislett ...	2	—	2
A. Berwick ...	1	22	23	A. G. Mason ...	2	—	2
H. Davies ...	—	22	22	Sandford, Stephen & Pollok-Morris ...	—	2	2
Bryanston Sch. ...	6	13	19				
P. Morshead ...	—	19	19				

Christ's Hospital, H. Disney, M. Glanvill, Miss Goodwin, A. J. Harthan and C. B. Wainwright ringed one bird each.

The following include totals for previous years :—

Merseyside Nat. Assoc. ...	—	130	130	J. Weaving ...	11	—	11
Kingswood Sch. ...	17	70	87	J. S. Hewitt ...	7	—	7
W. A. Cadman ...	4	65	69	Clayesmore Sch. ...	5	1	6
V. H. Spry ...	2	67	69	Dauntsey's Sch. ...	5	1	6
Miss Maxse ...	59	—	59	R. M. Garnett ...	1	5	6
C. Foster-Barham ...	4	15	19	G. B. Gooch ...	2	3	5
W. E. Macve ...	2	17	19	A. McMillan ...	2	3	5
Mrs. Lane ...	2	13	15	Mrs. Greenlees ...	—	3	3
				H. E. Smith ...	2	—	2

NUMBERS OF EACH SPECIES RINGED							RECOVERED		
			1909 to 1942	Trapped	Nest- lings	Total	Grand Total	of those ringed 1909-42	Per- centage
Raven	...	...	236	—	4	4	240	19	8.1
Crow, Carrion	...	...	1710	—	21	21	1731	79	4.6
Rook	...	...	5032	2	5	7	5039	249	4.9
Jackdaw	...	...	4051	11	10	21	4072	201	5.0
Magpie	...	...	1174	1	40	41	1215	44	3.7
Jay	...	...	545	—	6	6	551	35	6.4
Chough	...	...	49	—	—	—	49	3	6.1
Starling	...	...	69882	10	69	79	69961	3136	4.5
Greenfinch	...	...	30118	28	171	199	30317	2445	8.1
Goldfinch	...	...	517	2	49	51	568	8	1.5
Redpoll, Lesser	...	...	597	4	2	6	603	6	1.0
Linnet	...	...	10267	—	80	80	10347	70	0.7
Bullfinch	...	...	1597	1	10	11	1608	59	3.7
Chaffinch	...	...	33649	44	8	52	33701	1479	4.4
Brambling	...	...	1009	2	—	2	1011	41	4.1
Sparrow, Tree-	...	...	2440	1	72	73	2513	88	3.6
Bunting, Yellow	...	...	5799	13	83	96	5895	408	7.0
Bunting, Reed-	...	...	1906	1	40	41	1947	95	5.0
Lark, Sky-	...	...	3691	1	—	1	3692	47	1.3
Pipit, Tree-	...	...	1813	—	28	28	1841	5	0.3
Pipit, Meadow-	...	...	5494	8	64	72	5566	116	2.1
Pipit, Rock-	...	...	672	—	10	10	682	30	4.5
Wagtail, Yellow	...	...	1076	—	19	19	1095	4	0.4
Wagtail, Grey	...	...	876	1	26	27	903	2	0.2
Wagtail, Pied	...	...	6760	4	74	78	6838	91	1.3
Wagtail, White	...	...	79	—	—	—	79	—	—
Flycatcher, S.	...	...	3459	6	18	24	3483	14	0.4
Flycatcher, Pied	...	...	1439	—	17	17	1456	9	0.6
Chiffchaff	...	...	971	7	5	12	983	6	0.6
Warbler, Willow-	...	...	10465	46	4	50	10515	52	0.5
Warbler, Wood-	...	...	1062	—	13	13	1075	2	0.2
Warbler, Sedge-	...	...	1302	—	—	—	1302	7	0.5
Warbler, Garden-	...	...	1306	—	19	19	1325	5	0.4
Blackcap	...	...	949	—	20	20	969	2	0.2
Whitethroat...	...	...	4865	8	3	11	4876	33	0.7
Thrush, Mistle-	...	...	4825	4	51	55	4880	108	2.2
Thrush, Song-	...	...	68466	53	453	506	68972	1380	2.0
Redwing	...	...	962	—	—	—	962	7	0.7
Ouzel, Ring-	...	...	542	—	4	4	546	5	0.9
Blackbird	...	...	61019	70	56	126	61145	2949	4.8
Wheatear	...	...	1906	—	15	15	1921	39	2.0
Whinchat	...	...	1672	—	26	26	1698	12	0.7
Stonechat	...	...	848	1	32	33	881	5	0.6
Redstart	...	...	2126	2	65	67	2193	15	0.7
Robin	...	...	23477	19	19	38	23515	2269	9.7
Sparrow, Hedge-	...	...	15292	5	1	6	15298	1420	9.3
Wren...	...	...	3792	4	—	4	3796	25	0.7
Dipper	...	...	1545	14	69	83	1628	19	1.2
Swallow	...	...	44867	19	622	641	45508	415	0.9
Martin, House-	...	...	12313	7	142	149	12462	80	0.6
Martin, Sand-	...	...	4630	41	53	94	4724	12	0.3
Swift	...	...	1000	9	19	28	1028	62	6.2
Kingfisher	...	...	719	1	20	21	740	32	4.5
Cuckoo	...	...	760	1	16	17	777	21	2.8

NUMBERS OF EACH SPECIES RINGED

RECOVERED

		1909 to 1942	1943		Total	Grand Total	of those ringed 1909-42	Per- centage
			Trapped	Nest- lings				
Owl, Little ...	...	643	1	15	16	659	58	9.0
Owl, Long-eared ...	...	228	—	—	—	228	8	3.5
Owl, Barn- ...	...	627	1	26	27	654	63	10.1
Owl, Tawny ...	...	1064	4	20	24	1088	63	5.9
Falcon, Peregrine ...	...	93	—	3	3	96	9	9.7
Merlin ...	...	260	—	5	5	265	51	19.6
Kestrel ...	...	960	2	20	22	982	98	10.2
Buzzard ...	...	398	—	6	6	404	15	3.8
Hawk, Sparrow- ...	...	611	7	32	39	650	89	14.6
Heron, Common ...	...	2213	—	14	14	2227	273	12.3
Duck, Sheld- ...	...	474	—	—	—	474	22	4.6
Mallard ...	...	6972	4	2	6	6978	1120	16.1
Teal ...	...	3328	—	—	—	3328	405	12.2
Wigeon ...	...	424	2	—	2	426	62	14.6
Duck, Tufted ...	...	200	14	—	14	214	42	21.0
Goosander ...	...	52	—	—	—	52	10	19.6
Cormorant ...	...	2457	—	—	—	2457	518	21.1
Shag ...	...	1958	—	9	9	1967	197	10.1
Gannet ...	...	10254	—	29	29	10283	354	3.5
Petrel, Storm ...	...	576	—	—	—	576	41	7.1
Shearwater, Mx. ...	...	20007	18	—	18	20025	1011	5.1
Petrel, Fulmar ...	...	385	—	48	48	433	1	0.3
Pigeon, Wood- ...	...	2916	37	88	125	3041	117	4.0
Dove, Stock- ...	...	665	10	35	45	710	57	8.6
Dove, Turtle- ...	...	674	—	6	6	680	75	11.1
Curlew, Stone- ...	...	253	—	2	2	255	10	4.0
Oyster-catcher ...	...	1642	—	55	55	1697	68	4.1
Plover, Ringed ...	...	1531	—	20	20	1551	20	1.3
Plover, Golden ...	...	329	—	6	6	335	8	2.4
Lapwing ...	...	40135	7	362	369	40504	863	2.2
Dunlin ...	...	118	—	4	4	122	1	0.8
Sandpiper, C. ...	...	912	—	7	7	919	3	0.3
Redshank ...	...	2362	1	40	41	2403	81	3.4
Curlew, Common ...	...	3187	—	22	22	3209	126	4.0
Snipe, Common ...	...	1688	—	41	41	1729	86	5.1
Woodcock ...	...	5358	—	26	26	5384	410	7.7
Tern, Sandwich ...	...	17987	—	14	14	18001	319	1.8
Tern, Roseate ...	...	393	—	—	—	393	1	0.2
Tern, Common ...	...	19670	—	19	19	19689	471	2.4
Tern, Arctic ...	...	2991	—	104	104	3095	13	0.4
Tern, Little ...	...	812	—	4	4	816	8	1.0
Gull, B-headed ...	...	14112	100	—	100	14212	667	4.7
Gull, Common ...	...	1890	—	94	94	1984	65	3.4
Gull, Herring ...	...	8705	—	—	—	8705	240	2.8
Gull, L. Bl.-bkd. ...	...	10727	—	67	67	10794	416	3.9
Gull, G. Bl.-bkd. ...	...	613	1	21	22	635	22	3.6
Kittiwake ...	...	2019	—	5	5	2024	27	1.3
Skua, Great... ...	...	521	—	—	—	521	17	3.3
Razorbill ...	...	4552	3	11	14	4566	96	2.1
Guillemot ...	...	2463	—	8	8	2471	53	2.2
Puffin ...	...	5411	16	16	32	5443	90	1.7
Crake, Corn- ...	...	542	2	10	12	554	9	1.7
Moorhen ...	...	1727	9	7	16	1743	51	3.0

NOTES.

NOTTINGHAMSHIRE BIRD NOTES FOR 1943.

THE following notes mainly from South Notts are of interest as recording unusual numbers, or occurrences of birds of which there are no recent Notts records.

Most of the records are from Nottingham Sewage Farm, to the authorities of which thanks are due for permission, and the adjacent parts of the Trent Valley, unless otherwise stated.

The notes are a summary of the year's work of R. J. Raines, T. W. Raines, R. G. Williams and myself, and are the result of a more complete survey than was recorded for 1942 (*Brit. Birds*, Vol. xxxvi, pp. 242-3).

MERLIN (*Falco columbarius æsalon*).—One seen, September 18th.

WHOOPEE SWAN (*Cygnus cygnus*).—Two adults and one juvenile remained in the area from mid-November, 1942, till the end of March, 1943.

BEWICK'S SWAN (*Cygnus b. bewickii*).—On March 28th one adult was noted with the above Whoopers.

GREY LAG-GOOSE (*Anser a. anser*).—Flock of eight definitely identified on January 15th at Colwick. Very large size, heavy-looking head and orange bill noticeable at rest and grey "shoulders" in flight.

SHELD-DUCK (*Tadorna tadorna*).—Up to four seen from July 21st until mid-October.

RUDDY SHELD-DUCK (*Casarca ferruginea*).—Excellent views of two at rest and in flight on September 12th.

GADWALL (*Anas strepera*).—One October 31st and two in last week in November on Gravel Pond at Netherfield, all immature birds; white speculum well seen, conspicuous in flight.

PINTAIL (*Anas a. acuta*).—See *Brit. Birds*, Vol. xxxvii, p. 79; also on the same water two or three from September 20th until November 22nd, on which date nineteen were counted, then up to eleven till close of year. Six at Oxtun, December 27th.

SHOVELER (*Spatula clypeata*).—Twelve to fifteen pairs in area throughout breeding-season; one brood of eight noted. Forty-two on August 9th and a hundred and one on September 11th. From then up to twenty till close of the year.

SCAUP-DUCK (*Aythya m. marila*).—One immature on the Trent at Bulcote, December 25th. Stalked to very close quarters, when most of back was seen to be whitish with wavy black lines.

SMEW (*Mergus albellus*).—See *Brit. Birds*, Vol. xxxvii, p. 19; also three adult males on same water, December 25th onwards.

BAR-TAILED GODWIT (*Limosa l. lapponica*).—Four seen, one in red plumage, May 9th, six on July 27th and up to six regularly until September 2nd.

BLACK-TAILED GODWIT (*Limosa l. limosa*).—One, August 15th, six on the 23rd, and then one or two until October 17th.

CURLEW (*Numenius a. arquata*).—Summary of records shows eighty to a hundred and twenty in the area in winter months, often in one flock. Last spring occurrence, May 9th; earliest autumn, July 18th. Peak of two hundred and twenty counted birds on September 23rd.

TURNSTONE (*Arenaria i. interpres*).—One in full breeding-dress, May 9th and 11th. One, July 21st and for some days following.

KNOT (*Calidris c. canutus*).—Three still in breeding dress, July 21st. One in winter plumage end of July and early August.

CURLEW SANDPIPER (*Calidris testacea*).—One, May 9th. Autumn passage first noted, August 22nd. Numbers then built up rapidly until sixty-six were present on September 15th, and much smaller numbers were noted until the 22nd. Owing to the numbers extra care was taken in identification, the birds

being flushed repeatedly to make sure that each had a white rump. Though often feeding with 60-80 Dunlin, they almost invariably separated from them in flight into a flock composed entirely of their own species, which facilitated counting.

LITTLE STINT (*Calidris minuta*).—One, September 2nd. Five on the 15th, three on the 19th and four on Gravel Pond near Netherfield same morning. Twelve at Sewage Farm on the 20th, six on the 21st and one at Gravel Pond. Four, Sewage Farm on the 22nd and two on the 29th. One, October 3rd. Dunlin and Ringed Plover present on all these occasions made comparison in size and other details easy.

SANDERLING (*Crocethia alba*).—Three in pale winter dress on July 21st, two in breeding dress, July 27th. These five seen together on the 29th.

RUFF (*Philomachus pugnax*).—Some winter in area, outstanding figure being thirty-two on February 27th. Up to twenty-one seen March and April. First autumn birds on July 21st; numbers then built up rapidly to a peak of forty-six on September 21st. Three to four during October and two December 12th.

WOOD-SANDPIPER (*Tringa glareola*).—Two, August 8th, and one or two constantly (possibly same birds) until September 5th.

GREEN SANDPIPER (*Tringa ochropus*).—Up to five single birds January and February. First autumn birds on July 1st. Nineteen were seen on the 21st, thirty, August 10th, thirty-nine on the 15th and up to thirty until September 21st. Seven on October 3rd and three at the Gravel Pond, Netherfield. One at latter place, October 17th, then occasional odd ones until close of year.

REDSHANK (*Tringa totanus* subsp.?).—Flocks of twenty and fifteen on January 3rd. Scattered birds up to forty odd each visit February and March. Exact census of forty-four on April 4th. Twenty-five separate birds in song flight, May 9th. On June 30th flock of sixty-eight contained many juveniles. Eighty on July 21st; seventy, August 15th; fifty, September 15th, then up to thirty or forty till close of year. Except for the breeding-season, not so numerous as in late years.

SPOTTED REDSHANK (*Tringa erythropus*).—One bird, September 5th; six on the 15th.

GREENSHANK (*Tringa nebularia*).—Five on July 21st; then up to six regularly till September 18th.

GREY PLOVER (*Squatarola squatarola*).—Four in winter plumage, September 23rd and 24th.

BLACK TERN (*Chlidonias n. niger*).—One bird, September 5th.

SANDWICH TERN. (*Sterna s. sandvicensis*).—One over the Trent at Burton Joyce, June 8th, and one same place on the 13th.

ARCTIC TERN (*Sterna macrura*).—Definitely identified at close quarters several times amongst numerous Common Terns between May 28th and September 24th.

LITTLE TERN (*Sterna a. albifrons*).—One, August 19th; one on the 25th and three over Gravel Pond near Netherfield, same day.

LITTLE GULL (*Larus minutus*).—One adult watched at close quarters over the Trent at Burton Joyce on May 9th; diminutive size, completely black hood, small dark bill and absence of black on upper surface of wing were all well seen.

BLACK-HEADED GULL (*Larus r. ridibundus*).—See *Brit. Birds*, Vol. xxxvii, p. 78.

SCANDINAVIAN LESSER BLACK-BACKED GULL (*Larus f. fuscus*).—With the heavy autumn passage of *graellsii* definite identification of this form was obtained as follows. One on July 25th; two on August 12th; four on October 17th and eight on the 31st. The eight birds on October 31st were in company with British Lesser Black-backs and two Greater Black-backs. They were as dark on the mantle and wings as the latter, while the British form appeared blue-grey by comparison. By a complete circuit of the pond it was ascertained that from all angles and points of view the mantle appeared as dark as the primaries. Other records are only included where similar light conditions and presence of British form for comparison made identification straightforward.

GREAT BLACK-BACKED GULL (*Larus marinus*).—Regular in small numbers autumn and winter, but twenty-four on October 23rd is altogether exceptional.

All the commoner waders ducks and gulls occurred in considerable numbers, but have been omitted for consideration of space.

J. STATON.

STONECHATS HOVERING AND PICKING FOOD FROM WATER.

ON January 7th, 1944, near the centre of a sequestered mere in western Surrey—which is, more or less, surrounded on all sides by an extensive tract of bog and ling-covered waste—I observed, through glasses, a male and two female Stonechats (*Saxicola torquata hibernans*) clinging in Reed-Warbler fashion to reed-stems which, in places, still reared their bleached forms above the shallow water. Many times I watched these birds hover daintily (for the space of fully two seconds) an inch or so above the water, pick something off the surface, then re-settle upon a reed-stem (either close at hand or a short distance away) before again darting off, after a brief interval, to repeat the manœuvre. Occasionally, it was noticed, they selected for a stance other lower but more secure aquatic plants nearer the margin, upon the tops of which they perched in a normal manner.

About half-an-hour later, on returning to the spot, I again beheld two—male and female, members, presumably, of the original trio—still engaged in feeding in this picturesque though distinctly unusual manner. Eventually, both left the mere and flitted off to the neighbouring heath.

HUBERT E. POUNDS.

SIBERIAN CHIFFCHAFF IN IRELAND.

THE occurrence of a Siberian Chiffchaff (*Phylloscopus collybita tristis*) on migration at Eeragh Island Lighthouse, on the coast of Co. Galway, constitutes an addition to the List of Irish Birds. The bird was killed striking the wires on November 25th, 1943, during a N.W. gale. Mr. W. P. Roche, who found the bird, forwarded it to me in the flesh. Mr. N. B. Kinnear has since examined the specimen and identified it as the above.

ROBERT F. RUTTLEDGE.

BEHAVIOUR OF CONTINENTAL SONG-THRUSHES IN BRITAIN IN AUTUMN.

ON November 18th, 1943, a party of about twenty Continental Song-Thrushes (*Turdus ericetorum philomelus*) arrived in a garden on the outskirts of Sevenoaks. They began singing almost at once, and some birds chasing each other round bushes at high speed uttering a soft sub-song. One bird was obtained to verify the sub-specific identity and to examine the gonads; it proved to be an adult male, and the gonads showed very definite enlargement.

This is of interest, because it indicates a tendency to recrudescence of sexual behaviour in autumn in a migratory sub-species. It is probable, however, that these birds had arrived in Kent some weeks before this and were now more or less sedentary, although they had not lost any of the extreme shyness which is characteristic of these migrant Thrushes, and the bird examined was extremely fat. This is merely a suggestion based on Lack's *Life of the Robin*, p. 118-119, in which it is noted that male Robins which show autumn song and fighting do not migrate, whereas those females which do not sing in the autumn do migrate.

JEFFERY G. HARRISON.

THE BLACK REDSTART IN 1944.

IN view of the continued spread of the Black Redstart (*Phoenicurus o. gibraltariensis*) as a breeding species in England, (*cf. antea*, pp. 191-195), it is desired to continue to collect records of breeding pairs and non-breeding residents in 1944. As the winter status of the Black Redstart seems also to be changing, information on this point is sought as well. Information under the following headings should be sent to R. S. R. Fitter, 39 South Grove House, Highgate, N.6:—

1. All occurrences of the Black Redstart, summer and winter, for 1944, with dates, locality, description of terrain, and sex.
2. All unpublished occurrences for previous years, with similar details.
3. In the case of breeding records, locality (this will not be published if requested), description of nest-site and surroundings, dates and number of broods reared or attempted.
4. Dates of arrival and departure, and of beginning and ending of song.
5. Dates of egg-laying, incubation, hatching and fledging; number of young reared.
6. Plumage state of males, with especial reference to the extent of the white wing-patch.
7. Food.

DUPLICATE NESTS OF SWALLOW.

WHEN I was living in Clogheen, Co. Tipperary, in the yard behind and not far from my house there were some sheds, which were roofed over, but they had no doors. In one of these, in which some garden tools were kept, there were some Swallows' nests on the beam supporting the rafters. As the roof was quite watertight, the mud of which these nests were made did not get washed away and the same nests went on from year to year.

About 10 or 12 years ago I noticed that a pair of Swallows (*Hirundo r. rustica*) were nesting in this shed. After a time the hen bird began to sit, but she was very shy and always came off the nest when I entered the shed, which I did fairly frequently.

There happened to be two old nests on the beam, which were placed leaning against two rafters which were next to one another, and I should think they were about 18 inches apart. Before long I noticed that the Swallow sometimes flew off one of these nests and sometimes off the other. This seemed curious, and so after a week or so I got a step-ladder and investigated. I found that this pair of Swallows had repaired both of these nests by putting a fresh lining of feathers in them, and that the hen bird had laid two eggs in each nest, and was sometimes sitting on one nest and sometimes on the other. As the two eggs which were not being sat on were of course getting cold, the bird had no hope of hatching out anything, and I took away all four eggs. The same pair then nested in another nest in the same shed and hatched out a brood quite normally. I am quite sure that there was only one pair of Swallows in the shed that year.

A. G. CULME-SEYMOUR.

[Mr. Culme-Seymour's case is a variant of the multiple nest-building occasionally recorded where birds have failed to distinguish between a series of adjacent and identical sites, such as the spaces between the rungs of a ladder hung on a wall. It is evident that the Swallows were confused by the similar situations of the two nests against adjacent rafters.—EDS.]

NORTHERN GREAT SPOTTED WOODPECKER IN KENT.

A FEMALE Great Spotted Woodpecker of the Northern race (*Dryobates m. major*) was obtained near Deal, in east Kent on January 29th, 1944, and would appear to be the first recognized example for this county. The specimen was compared with examples from Sweden and Norway, as also with series of *D. m. anglicus* and *D. m. pinetorum*. The characters upon which the determination was made are as follows: paler, less brown underparts, whiter ear coverts and sides of face, purer white of shoulder patches and heavy bill. This latter feature is stated as being easier to see than to demonstrate on measurement. The measurements of this example are as follows: wing 139 mm.; bill 27.5 mm.; tarsus 26 mm.; tail, measurement impossible owing to damage.

J. M. HARRISON.

DRUMMING OF GREAT AND LESSER SPOTTED WOODPECKERS.

WITH reference to the interesting paper by N. D. Pullen (*antea*, pp. 175-6) showing that the drumming of the Great Spotted Woodpecker (*Dryobates major*) is definitely mechanical and not vocal, further proof of this is afforded by some observations made at Dartington in South Devon in 1936-1940. For three years (at least) an upper branch of a tree was regularly used by individuals of both this species and the Lesser Spotted Woodpecker (*D. minor*) for drumming. They came repeatedly to this particular branch

and adjacent trees were not used. Eventually the tree was felled, when the branch concerned was found to be pitted all over with beak marks. Furthermore, an individual of each species continued to use the tree for drumming after it was felled and while it lay on the ground, and fresh beak marks were found after this. I was not aware before that these species would use a fallen tree for drumming, and it is also interesting that individuals of both species should use the same branch in the same season.

DAVID LACK.

BEWICK'S SWANS IN MIDDLESEX.

ON Sunday, February 20th, 1944, J. McLay and I observed a party of Bewick's Swans (*Cygnus b. bewickii*) at Ruislip Reservoir consisting of two adults and four young. They allowed quite close approach and size, neck and bill pattern quickly identified them. The young were greyish and in them the yellow area of the bill was pinkish horn. This appears to be the second record for the species for Middlesex.

RONALD H. RYALL.

EARLY BREEDING OF ROCK-DOVE.

I NOTICE in *The Handbook* that March is given as the early nesting time of this bird. Here on the Eathie Shore by Cromarty are many caves, where the Rock-Dove (*Columba l. livia*) nests in large numbers every year. On January 15th, 1944, in one group of caves, I was amazed to find nesting occupations in full swing. From one nest, large fragments of shell had fallen, showing that the eggs had hatched. (Sometimes the Rock-Dove turns the small end of the egg into the large and carries it away from the nest, sometimes the broken shells are merely dropped from the nest). On this occasion I was unable to verify the presence of young, as the nests were inaccessible to me.

On January 29th, I revisited the caves. By this time many more broken shells were in evidence. My son was with me, and he succeeded in climbing to one of the nests. This latter contained two eggs.

It is a curious fact that in caves a little further along the coast, there was no sign of even the beginning of nesting. The Rock-Doves on Eathie shore have only a very slight admixture of domestic pigeon stock.

JOHN LEES.

CONTINENTAL REDSHANK IN KENT.

THE first Kentish record for the Continental Redshank (*Tringa t. totanus*) was recorded by me (*antea*, Vol. xxxvi, p. 163). This specimen was seen and the identification confirmed by the late Mr. H. F. Witherby. I am now able to record a second example for Kent. This specimen is a male, and was obtained on a coastal marsh near Deal, on May 18th, 1943. It is an individual of the light phase of the species and has a wing measurement of 150 mm.

J. M. HARRISON.

REVIEWS.

John Ray, Naturalist: His Life and Works. By Charles E. Raven, D.D.
(Cambridge University Press, 1942). 30s.

"OUR countryman, the excellent Mr. Ray" (1627-1705) was unquestionably one of the greatest naturalists who ever lived. At first sight, therefore, it may seem surprising that no satisfactory biography of this great man has hitherto appeared. But a perusal of Professor Raven's book provides an explanation. Acquaintance with the currents of thought and theological disputes of the seventeenth century is essential for the understanding of Ray's life and the reasons which led the blacksmith's son, who had become a fellow of Trinity College, Cambridge, to resign his position for conscience sake and devote the rest of his life to a study of the works of God in the creation. A wide knowledge of almost every branch of natural history is necessary for the appreciation of Ray's researches on plants, birds, fishes, insects and fossils. It may be doubted whether anyone since Ray's time has equalled Professor Raven in familiarity with such a diversity of fields of knowledge and this book may assuredly be described as a monument to the learning of both John Ray and his biographer.

In explanation of the appearance of this review so long after the publication of the book it must be stated that the late Mr. Witherby had intended to review it himself and before his final illness had made a number of rough notes for this purpose. Doubtless he would have rewritten and combined them if he had been spared to complete a review, but as they indicate some of the points which specially impressed him we may be permitted to quote them. He noted that the book is a record of "the vast and varied achievement of one who laid the foundation of the modern outlook upon nature." "Ray, in a time of universal turmoil, saw the need for precise and ordered knowledge, set himself to test the old and explore the new, and by dint of immense labour in the field and in the study laid the foundations of modern science in many branches of zoology and botany." "His main study was botany, and, as the author says, it is difficult in these days of specialization to believe that a man could make himself expert in the whole of zoology, as Ray did, in the intervals of his botanical researches." "Ray maintained that, for the naturalist, museum studies must be subordinate to first-hand knowledge of the organism in its habitat, and that classification must take into account the function as well as the structure." These sentences, which are quoted or modified from statements of the author, sufficiently indicate the importance of this book as a contribution to the history of science. Between Aristotle and Darwin we cannot place any naturalist above John Ray in genius or in achievement. Now, at last, he is worthily commemorated.

In the limited space available we cannot say more of the chapters on Ray's life, his travels and his work in other branches of science than that they are full of fascinating details and give us a picture not only of the man himself, but of his friends and scientific contemporaries and their views. We must however refer to the chapter entitled "The Ornithology", in which the author discusses not only the Latin and English editions of the "Ornithology of Francis Willughby" but also the posthumous "Synopsis Methodica Avium et Piscium." The ornithologist unfamiliar with these works will doubtless be surprised to discover how much information on birds and their habits was known to the authors. The exact shares of Ray and Willughby in accumulating this information can never be known exactly, but the view formerly held, and published by several ornithologists, that Ray was a botanist who gained all his knowledge of birds from Willughby, is demonstrably false. Professor Raven shows that Ray had dissected birds at Cambridge before Willughby came up to the University, that during the period of their partnership they each made notes on the birds they saw and obtained and that when, during their travels, Willughby went to Spain, leaving Ray in Italy, the latter continued to make notes on the birds he found in the markets, but Willughby made none in Spain. In loyalty to his friend Ray gave Willughby's name to

the book for which he had begun to collect notes, but there is no question that the book as we know it, especially the English edition, is almost entirely the work of Ray.

W.B.A.

LOCAL REPORTS.

Leicester Literary and Philosophical Society: Ornithological Section for Leicestershire and Rutland. County Report and Status of Wild Birds for 1942. With which are incorporated some brief records of Nottinghamshire. 2s. 6d.

THIS report is on much the same lines as in the previous year. The notes on the status of each species in Leicestershire and Rutland have in many cases been amplified and the status of each in Nottinghamshire is also given more briefly. We note that the Committee decided "That all observations of the uncommon birds, when seen by one member only, be shown in the County Report in 'square brackets,' indicating that the observation is accepted with an element of reserve." Among records so treated are those of a Firecrest seen in May and an Alpine Swift in April. In both cases the published evidence suggests that the birds were correctly identified, but the rule obviously diminishes the difficulty of the compiler's task and is worthy of consideration by other societies.

Birmingham Bird Club: Ninth Annual Report on the Birds of Warwickshire, Worcestershire and South Staffordshire, 1942. 1s. 6d.

IN addition to the classified notes this report contains a brief article on the status of geese in Worcestershire by A. J. Harthan and the results of a survey of Sand-Martin colonies in the same county by H. J. Tooby and A. J. Harthan. This illustrates the close dependence of the numbers of these birds on local geological conditions. Single male Golden Orioles were observed in Worcestershire in June, 1941 and May, 1942, and a small flock of Twites in the same county in January, 1942. At Bellfields reservoir, S. Staffs., where in the winter of 1927-28 about 50 Black-headed Gulls were present by day and probably roosted (*antea*, Vol. xxii, p. 22) the numbers of roosting birds of this species in March, 1942, reached at least 4,000, and at the end of the year about 250 Herring-Gulls were also present.

Yorkshire Naturalists' Union: Committee for Ornithology Report for 1942. Edited by R. Chislett. (Reprinted from *The Naturalist*, April-June, 1943). 1s. 0d.

As usual this report contains much interesting information, though records from the coast are comparatively few owing to military restrictions. It is reported that shore-feeders are becoming less shy near Bridlington as the result of beach restrictions and that owing to the decrease of the fishing industry and the resulting lack of food in harbours gulls are tending to feed more inland. A male Golden Oriole was observed on July 8th at Hutton-le-Hole and single Hoopoes were seen on April 21st at Sigglesworth Hall and on September 8th in a garden at Swanland. Visits have been paid by Hoopoes to this same garden in each of the last three years. The Nightingale was not reported from any locality in the county in 1942. Three pairs of Montagu's Harriers are recorded in the North Riding, of which one pair reared three young, a second pair probably did so and the third failed. A pair of Gannets again nested at Bempton, and two pairs of Oystercatchers are reported to have bred in Airedale. Two flocks of Little Auks each numbering between 50 and 100 were reported about November 15th from Weighton Lock, Faxfleet.

Ornithological Record for Derbyshire, 1942. By W. K. Marshall. (Reprinted from the *Derbyshire Arch. and Nat. Hist. Soc. Journ.*, 1942).

MOST of the items in this report are chiefly of local interest. Occasional records are included from S. Yorks and Staffs. We note that three Spoonbills were seen flying south-west over Lea on Whit Monday and that at least eight pairs of Short-eared Owls probably nested in the county. The statement

that a Ciri Bunting's nest with four eggs was found near Melbourne in June should have been accompanied by some evidence of identification, though particulars kindly supplied to us by Mr. H. J. Wain show that it is in fact correct.

Natural History Notes for the District with the Proceedings of the Liverpool Naturalists' Field Club, 1942. 1s. 6d.

IN the short section devoted to "Ornithological Notes" there is a record of a Nuthatch seen in August near Wigan, a region outside its normal range. N. F. Ellison contributes a special article on the Willow-Tit in Wirral, where a pair were seen feeding young. It appears that this is the first authentic record of breeding in the region, a previous record being due to a mistake.

Cambridge Bird Club Report, 1942. (Edited by J. G. Harrison). 1s. 6d.

IN the annotated list it is stated that a Jay shot at Six Mile Bottom on March 17th matches birds from Switzerland and Holland and constitutes the first record for the county of *Garrulus g. glandarius*. The most interesting wader seen at the sewage farm was a Little Ringed Plover already reported in this journal (*antea*, Vol. xxxvi, p. 76). There is a report by N. W. Moore and J. G. Harrison on the Bird Population of the Cambridgeshire Woodlands based on visits to 85 woods having a total area of 1,350 acres. A separate section deals with the birds of the Wash, to which members made four excursions, three to the Lincolnshire and one to the Norfolk side.

The Hastings and East Sussex Naturalist: Notes on the Local Fauna and Flora for 1942. By N. F. Ticehurst.

IN the section on birds we note that the Wood-Lark was for the first time definitely proved to breed in the district, in two separate localities. A Black-winged Stilt was seen at the Wicks in May. The gulls nesting at Dungeness were much disturbed by the collection of their eggs, those of the Black-headed Gull being retailed at 3½d. each. A colony of about a dozen pairs of Common Gulls nested in a new locality.

Fifteenth Report of the Devon Bird-Watching and Preservation Society, 1942.

IN this report the records are as usual arranged alphabetically instead of in systematic order. We wish the editors would reconsider this inconvenient and tiresome arrangement, which means that anyone desiring information on, say, waders has to search through the whole report and has no compensating advantage that we can see. Reference to localities is facilitated by arranging them in eight districts in Devon with a ninth for West Somerset. Rare birds recorded include a Glossy Ibis shot at Braunton Marsh, two Richard's Pipits seen on the Otter Estuary and a Kite seen on Exmoor. Records of exceptionally large numbers of Redshank settling on deep water are also interesting. The maximum numbers of various species seen include some remarkable figures. Approximately 1,100 Common Terns were counted on the Exe Estuary on August 22nd and 80 Little Stints on the Taw Estuary on October 24th. So unusual a record as the latter should have been accompanied by some evidence of correct identification.

Wild Bird Protection in Norfolk, 1942.

As usual this report contains many interesting items. A Goshawk was seen by Mr. Jim. Vincent at Hickling on November 25th and another, or the same, by Mr. H. Wormald near Elmham on December 7th. Two or three White-tailed Eagles visited the county in winter and a Woodchat Shrike was seen in May. Both at Horsey and at Hickling the numbers of Bitterns, Water-Rails and Bearded Tits were again severely reduced by the hard winter. In addition to the Squacco Heron, Little Bittern and Solitary Sandpiper already recorded by Mr. Vincent in this journal, we note that visitors to Hickling included a Kite, a White Stork, two Whiskered Terns and a Richard's Pipit. Dr. R. Leonard Ley contributes some interesting notes from Yarmouth, especially concerning the behaviour of geese.

W.B.A.

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